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METAL-MINE ACCIDENTS
IN THE
UNITED STATES

DURING THE CALENDAR YEAR 1918

(With supplemental labor and accident tables for the years 1911 to 1918, inclusive)

COMPILED BY
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METAL-MINE ACCIDENTS DURING THE CALENDAR YEAR 1918.

Compiled by ALBERT H. FAY.

INTRODUCTION.

Returns for the year 1918 received by the Bureau of Mines from the operators of metal mines are extremely gratifying, as they show the lowest fatality rate recorded since the bureau began the collection of accident statistics in 1911. The nonfatal injuries show a slight decrease in spite of war conditions and labor shortage.

The report for the year 1918 includes returns from 3,636 operators, as compared with 4,637 for the year 1917, being about 1,000 less than the number reporting for 1917. This large decrease in the number of operators is mainly due to the cessation of prospecting, and the closing of many small mines, especially gold mines, on account of the abnormal conditions resulting from the war. The number of days' work done during 1918 was 3,300,000 less than in the previous year. Compared with the 1917 returns, the number of employees in the different groups of mines is as follows: Copper mines and iron mines employed practically the same number as in 1917; nonmetallic mineral mines show an increase of about 2,000; and the gold and silver group shows a decrease of 8,300. The lead and zinc mines of the Mississippi Valley show a decrease of 6,000. The total number of men reported employed in 1918 was 182,606, as compared with 200,579 in 1917. In addition the metallurgical works (not including iron and steel) reported 79,752 men in 1918, as compared with 84,042 in 1917.

There were 646 fatalities reported in 1918. The fatality rate for 1918 is, therefore, 3.57 per 1,000 300-day workers, as compared with the normal rate of 3.60 per 1,000 for 1917 and 3.62 for 1916, the 1918 rate being the lowest recorded since the Bureau of Mines began the collection of accident statistics at metal mines in 1911, when the rate was 4.45 per 1,000 300-day workers.

The number of nonfatal injuries was 42,915 as compared with 46,286 in 1917, making a nonfatal accident rate of 237.09 per 1,000 300-day workers, as compared with 240.97 per 1,000 in 1917 and 250.64 in 1916. It is believed that the foregoing nonfatal injury rates at metal mines are lower than those that actually exist. This statement is borne out by the data compiled in Table 20 (p. 53) which show for a period of four years details compiled from the reports of representative companies at whose mines systematic records are being kept and a large amount of safety work is being done. The average nonfatal injury rate at these representative mines was 318 per 1,000 300-day workers in 1917 and 323 in 1918.

SCOPE OF STATISTICS.

In the compilation of the figures given in the following tables, which are derived from reports received from operators, the size of the mines was not considered, consequently the figures cover reports from prospectors, development companies, and producing mines. Although the Bureau of Mines is authorized to collect data on accidents at mines, there is no Federal law compelling operators to render such reports. However, the majority of the operators promptly and cheerfully replied to the bureau's requests for information. The tabulated statistics represent 3,636 operators who actually worked their mines during the year, thus giving statistics that are representative of the industry. Special tables have been prepared showing accidents by causes, States, industrial groups, and mining methods.

The tables in the following pages are arranged so as to represent five divisions of the mining industry, as follows:

Copper mines.—All of the copper mines and prospects that were reported in operation in the various copper-producing States are included in this group. The list represents 524 operators. (Tables 6, 7, 16, 17, and 18.)

Gold, silver, and miscellaneous metal mines.—This group comprises the gold mines, both lode and placer, silver mines, lead-silver mines, gold-silver mines, the lead and zinc mines other than those in the Mississippi Valley, and the mines working ores of quicksilver, manganese, tungsten, vanadium, chromium, etc. Also, pyrite mines are included, as the cinder is used in some metallurgical works for its iron and copper content, and bauxite mines, because bauxite is the principal source of metallic aluminum. This group represents 2,429 operators, who reported their mines as active part or all of the year. (Tables 8, 9, 16, 17, and 18.)

Iron mines.—All of the important iron mines, representing 176 operators, are included in this group. (Tables 10, 11, 16, 17, and 18.)

Lead and zinc mines (Mississippi Valley).—The lead and zinc mines of the Mississippi Valley, represented by reports of 236 operators, are grouped together as representing an industry in which general conditions are similar. (Tables 12, 13, 16, 17, and 18.)

Nonmetallic mineral mines.—The nonmetallic mineral mines, representing 271 operators, include those for asbestos, asphaltum, barite, feldspar, garnet, graphite, gypsum, kaolin, mica, phosphate rock, quartz, talc, salt, and soapstone. Coal mines are not included. (Tables 14, 15, 16, 17, and 18.)

ACKNOWLEDGMENTS.

The Bureau of Mines gratefully acknowledges the assistance of the State mine inspectors and other officials of the various State mining departments, who have verified and corrected from their records, often by expending considerable labor, the data reported to the bureau by the operators. Special mention should be made of the assistance rendered by the mine inspectors of Alaska, Arizona, Colorado, Idaho, and South Dakota, and the Industrial Accident Commission of California, and the Nevada Industrial Commission. To both the operators and the State mining officials the Bureau of Mines extends its thanks for their hearty cooperation. The author acknowledges the assistance rendered by W. W. Adams, Miss Mary Bringhurst, and Miss Etta V. Walters.

PUBLICATION OF ACCIDENT STATISTICS.

In publishing these statistics the Federal Bureau of Mines has no intent of encroaching on the field covered by the annual or biennial reports of State mine inspectors or mining departments. The bureau hopes, however, that the distribution of this information will help to establish a uniform basis for recording and reporting mine accidents, the number of men employed, and the number of days' work performed. When all mine-accident statistics are thus placed on the same basis, the making of comparisons and the drawing of conclusions will be rendered much easier.

As bearing on the difficulties that attend the compilation of comparable figures, attention is called to these facts: A number of States have no inspectors for metal mines. There is a lack of uniformity in the reports issued by the various States, as the fiscal years are not the same. The mines subject to inspection differ; in some States all mines are included, whereas in others only those mines employing 5, 10, or 20 men underground are included. Compensation laws in most States apply to all mines, but in some they are elective at the option of the operator. Although the total number of deaths reported in the various States agrees closely with the inspectors' reports, there is some variation as to the classification.

The Bureau of Mines will be glad to receive suggestions from State inspectors, and from any person interested in mining, as to the form in which accident statistics can be presented most effectively and their publication made most useful to the mining industry.

CLASSIFICATION OF INJURIES.

As many of the States now have compensation laws, the bureau's classification of serious and slight injuries is on a 14-day (2-week) basis in order to conform to the classification used by the States. This classification of injuries includes three types, as follows:

Fatal, serious, and slight injuries, 1916, 1917, and 1918.

Injury.	1916	1917	1918
1. Fatal	697	852	646
2. Serious (time lost more than 14 days):			
A. Permanent disability—			
Total [a]	44	39	62
Partial [b]	693	666	640
B. Others	10,099	10,220	9,066
3. Slight (time lost, 1 to 14 days, inclusive)	37,401	35,361	33,147
Total nonfatal injuries	48,237	46,286	42,915

[a] Permanent total disability: Loss of both legs or arms, one leg and one arm, total loss of eyesight, paralysis, or other condition permanently incapacitating workman from doing any work of a gainful occupation.

[b] Permanent partial disability: Loss of one foot, leg, hand, eye, one or more fingers, one or more toes, any dislocation where ligaments are severed, or any other injury known in surgery to be permanent partial disability.

TABLE 1.—***ALL MINES:*** *Men employed, and number killed and injured, by kinds of mines, during the years ended Dec. 31, 1918 and 1917.*

Kind of mine.	Active operators.	Men employed.			Average days active.	Days of labor performed.	Number killed.			Number injured. (Time lost, more than 1 day.)			Widows.	Orphans.
		Underground.	Surface.	Total.			Underground.	Surface.	**Total.**	Underground.	Surface.	**Total.**		
1918.														
Copper	524	42,286	17,161	59,447	321	19,104,178	180	40	**220**	17,201	3,312	**20,513**	93	177
Gold, silver, and miscellaneous metal	2,429	28,061	15,582	43,643	197	12,712,556	152	29	**181**	5,429	2,418	**7,847**	40	72
Iron	176	28,775	24,890	53,665	290	15,563,332	128	51	**179**	6,858	2,763	**9,621**	102	282
Lead and zinc (Mississippi Valley)	236	10,344	3,660	14,004	251	3,517,003	43	4	**47**	3,145	601	**3,746**	29	59
Nonmetallic mineral	271	2,690	9,157	11,847	287	3,404,679	10	9	**19**	334	854	**1,188**	14	25
Total, 1918	**3,636**	**112,156**	**70,450**	**182,606**	**297**	**54,301,743**	**513**	**133**	**646**	**32,967**	**9,948**	**42,915**	**278**	**615**
1917.														
Copper	649	43,715	17,560	61,275	312	19,085,563	[a] 352	22	**374**	16,532	3,403	**19,935**	142	336
Gold, silver, and miscellaneous metal	3,166	35,812	16,080	51,892	281	14,581,811	166	30	**196**	7,144	1,241	**8,385**	41	60
Iron	205	31,549	25,681	57,230	283	16,188,051	135	56	**191**	8,872	3,406	**12,278**	85	190
Lead and zinc (Mississippi Valley)	369	15,075	5,194	20,269	246	4,993,390	65	3	**68**	3,777	767	**4,544**	42	78
Nonmetallic mineral	248	2,726	7,187	9,913	280	2,776,996	9	14	**23**	430	714	**1,144**	15	28
Total, 1917	**4,637**	**128,877**	**71,702**	**200,579**	**287**	**57,625,811**	**727**	**125**	**852**	**36,755**	**9,531**	**46,286**	**325**	**692**

[a] Includes 161 fatalities due to the North Butte mine fire, Butte, Mont.

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TABLE 2.—***ALL MINES:*** *Fatalities and injuries per 1,000 300-day workers, employed during the years ended Dec. 31, 1911 to 1918.*

Kind of mine.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Underground.	Surface.	Total.	Underground.	Surface.	Total.	Underground.	Surface.	Total.
1918.									
Copper	45,001	18,680	63,681	4.00	2.14	3.45	382.24	177.30	322.12
Gold, silver, and miscellaneous metal	28,722	13,653	42,375	5.29	2.12	4.27	189.02	177.10	185.18
Iron	28,515	23,363	51,878	4.49	2.18	3.45	240.50	118.26	185.45
Lead and zinc (Mississippi Valley)	8,778	2,945	11,723	4.33	1.36	3.58	358.28	204.07	319.54
Nonmetallic mineral	2,425	8,924	11,349	4.12	1.01	1.67	137.79	95.70	104.69
Total, 1918	**113,441**	**67,565**	**181,006**	**4.52**	**1.97**	**3.57**	**290.61**	**147.24**	**237.09**
1917.									
Copper	46,016	17,603	63,619	7.65	1.25	[a] 5.88	359.27	193.32	313.35
Gold, silver, and miscellaneous metal	34,473	14,133	48,606	4.82	2.12	4.03	207.23	87.81	172.51
Iron	31,032	22,928	53,960	4.35	2.44	3.54	285.90	148.55	227.54
Lead and zinc (Mississippi Valley)	12,444	4,200	16,644	5.22	.71	4.09	303.50	182.62	272.99
Nonmetallic mineral	2,850	6,406	9,256	3.16	2.19	2.48	150.82	111.46	123.58
Total, 1917	**126,815**	**65,270**	**192,085**	**5.73**	**1.92**	**4.44**	**289.83**	**146.02**	**240.97**
Total, 1916	125,601	66,854	192,455	4.57	1.84	3.62	306.12	146.41	250.64
Total, 1915	89,821	52,176	141,997	5.02	1.95	3.89	319.85	125.84	248.56
Total, 1914	91,659	50,960	142,619	5.08	1.82	3.92	261.81	122.04	211.87
Total, 1913	121,293	62,300	183,593	4.52	2.17	3.72	210.44	119.52	179.59
Total, 1912	105,153	56,509	161,662	4.96	2.46	4.09	236.42	103.95	190.11
Total, 1911	98,389	57,700	156,089	5.51	2.65	4.45	217.28	90.10	170.27

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[a] Excluding the deaths from the North Butte mine fire, the fatality rate was 3.34 per 1,000, the lowest on record for the copper group.

TABLE 3.—***ALL MINES:*** *Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1918.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	Total.		Under-ground.	Surface.	**Total.**		
Alabama	38	4,741	3,234	**7,975**	1,505,538	892,374	2,397,912	301	24	1	**25**	11	38
Alaska	270	2,229	3,281	**5,510**	708,912	667,659	1,376,571	250	8	....	**8**	3	8
Arizona	321	14,164	5,227	**19,331**	4,758,121	1,708,429	6,466,550	333	63	23	**86**	37	66
Arkansas	21	145	650	**795**	20,980	153,535	174,515	220	....	1	**1**	....	....
California[a]	389	5,203	4,547	**9,750**	1,561,090	1,364,020	2,925,110	300	44	10	**54**	....	....
Colorado[b]	450	6,949	1,474	**8,423**	2,084,696	442,239	2,526,935	300	34	5	**39**	....	....
Connecticut	3	30	49	**79**	9,060	13,970	23,030	292	....	....	....	....	....
Florida	14	....	2,582	**2,582**	....	821,690	821,690	318	....	3	**3**	3	4
Georgia	20	316	429	**745**	89,814	90,419	180,233	242	....	1	**1**	1	....
Idaho	282	3,166	1,298	**4,464**	908,597	332,492	1,241,089	278	14	3	**17**	6	7
Illinois	8	421	244	**665**	115,101	58,503	173,604	261	3	....	**3**	3	6
Iowa	6	221	141	**362**	45,951	30,046	75,997	210	....	....	....	....	....
Kansas	26	725	387	**1,112**	147,351	93,815	241,166	217	5	1	**6**	5	13
Kentucky	15	276	228	**504**	81,430	50,992	132,422	263	2	....	**2**	1	2
Maine[c]	....	....	....	....	....	....	....	....	....	....	....	....	....
Maryland	8	10	60	**70**	2,600	13,180	15,780	225	....	....	....	....	....
Massachusetts	3	23	10	**33**	7,000	2,340	9,340	283	....	....	....	....	....
Michigan	70	21,575	11,661	**33,236**	6,413,365	3,460,696	9,874,061	297	96	13	**109**	57	154
Minnesota	62	8,379	11,999	**20,378**	2,524,996	3,386,150	5,911,146	290	29	35	**64**	41	103
Missouri	101	4,639	1,424	**6,063**	1,227,731	347,418	1,575,149	260	11	1	**12**	9	17
Montana	216	15,903	1,955	**17,858**	4,902,356	577,482	5,479,838	307	61	3	**64**	29	60
Nevada[d]	414	3,382	2,307	**5,689**	1,217,340	830,640	2,047,980	360	30	3	**33**	5	4
New Hampshire	9	31	61	**92**	6,368	12,568	18,936	206	1	....	**1**	1	2
New Jersey	6	1,556	645	**2,201**	469,308	190,670	659,978	300	10	....	**10**	7	17
New Mexico	92	1,761	2,233	**3,994**	459,621	706,278	1,165,899	292	12	3	**15**	8	14
New York	31	2,259	1,389	**3,648**	655,792	388,392	1,044,184	286	13	1	**14**	6	11
North Carolina	25	243	326	**569**	70,476	64,222	134,698	237	2	....	**2**	1	1
Ohio[c]	....	....	....	....	....	....	....	....	....	....	....	....	....
Oklahoma	51	2,655	890	**3,545**	636,191	208,649	844,840	238	13	....	**13**	8	17
Oregon	140	679	608	**1,287**	149,764	103,178	252,942	197	2	2	**4**	2	3
Pennsylvania	18	36	300	**336**	8,813	78,449	87,262	260	....	1	**1**	1	....
South Carolina[c]	....	....	....	....	....	....	....	....	....	....	....	....	....
South Dakota[e]	48	961	554	**1,515**	354,969	144,331	499,300	330	....	1	**1**	....	....
Tennessee	37	1,263	2,338	**3,601**	372,259	580,100	952,359	264	8	5	**13**	6	14
Texas	14	410	1,004	**1,414**	140,690	348,464	489,154	346	1	3	**4**	2	7
Utah	178	4,165	2,736	**6,901**	1,403,926	943,707	2,347,633	340	17	11	**28**	17	32
Vermont	7	106	34	**140**	32,565	9,201	41,766	298	....	....	....	....	....
Virginia	40	816	1,334	**2,150**	233,690	334,999	568,689	265	4	1	**5**	5	12

Washington	112	373	498	**871**	66,188	117,775	183,963	211					
Wisconsin	50	2,086	972	**3,058**	579,322	258,972	838,294	274	6	2	8	3	3
Wyoming	31	154	249	**403**	35,650	66,293	101,943	253					
Other States	10	105	1,092	**1,197**	24,710	375,080	399,790	334					
Total, 1918	**3,636**	**112,156**	**70,450**	**182,606**	**34,032,331**	**20,269,417**	**54,301,748**	**297**	**513**	**133**	**646**	**278**	**615**
Total, 1917	4,637	128,877	71,702	**200,579**	38,044,605	19,581,206	57,625,811	287	727	125	**852**	325	692
Total, 1916	5,258	133,163	71,522	**204,685**	37,680,628	20,055,797	57,736,425	282	574	123	**697**	285	574
Total, 1915	4,322	96,223	55,895	**152,118**	26,946,220	15,652,795	42,599,015	280	451	102	**553**	275	484
Total, 1914	4,805	101,618	56,497	**158,115**	27,497,780	15,288,060	42,785,840	271	466	93	**559**	252	442
Total, 1913	6,387	126,369	64,907	**191,276**	36,387,908	18,689,947	55,077,855	288	548	135	**683**	286	501
Total, 1912	5,967	110,056	59,143	**169,199**	31,546,002	16,952,508	48,498,510	287	522	139	**661**	273	520
Total, 1911	5,232	104,623	61,356	**165,979**	29,516,604	17,309,969	46,826,573	282	542	153	**695**	297	600

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[a] All data in this and other tables for 1918 supplied by the industrial accidents commission of California.

[b] All data in this and other tables for 1918 supplied by Horace F. Lunt, commissioner, State bureau of mines, Colorado.

[c] Not segregated.

[d] All data in this and other tables for 1918 supplied by the Nevada industrial commission.

[e] **All data in this and other tables for 1918 supplied by Otto Ellerman, State mine inspector.**

TABLE 4.—*ALL MINES: Fatalities, by causes*

State.	Underground.									
	Fall of rock or ore from roof or wall. 1	Rock or ore while loading at working face. 2	Timber or hand tools. 3	Explosives. 4	Haulage accidents. 5	Falling down chute, winze, raise, or stope. 6	Run of ore from chute or pocket. 7	Drilling accidents. 8	Electricity. 9	Machinery (not including locomotives or drills). 10
Alabama	6		1	6	3					
Alaska	2					3			1	
Arizona	20			8	9	5	2		1	
Arkansas										
California	15			4	3	6			3	
Colorado	17		1	3		4	2			
Connecticut										
Florida										
Georgia										
Idaho	5			2	1				1	
Illinois										
Iowa										
Kansas				3						
Kentucky		1		1						
Maine										
Maryland										
Massachusetts										
Michigan	35	8	1	5	7	1	1		5	
Minnesota	15			4	1	1			2	
Missouri	3				1					
Montana	29	2		4	3	7			3	
Nevada	7			7	7	4	1	1		
New Hampshire										
New Jersey	3			1		1				
New Mexico	1			3		1		3		
New York	2			4	2					
North Carolina	1									
Ohio										
Oklahoma	6									
Oregon	1									
Pennsylvania										
South Carolina										
South Dakota										
Tennessee	4	1		1	1					
Texas										
Utah	2	1	1		2	4				1
Vermont										
Virginia	2				1	1				
Washington										
Wisconsin	2				1					
Wyoming										
Other States										
Total, 1918	**178**	**13**	**4**	**56**	**42**	**38**	**6**	**4**	**16**	**1**
Total, 1917	206	15	2	69	36	56	7	2	11	3
Total, 1916	217	10	2	74	33	40	11		17	2
Total, 1915	191	10	7	72	18	45	10	1	10	
Total, 1914	185	7	3	49	31	48	5	3	8	1
Total, 1913	220	10	8	77	35	52	10		16	4
Total, 1912	212	2	6	73	35	43	10	2	19	2
Total, 1911	191		10	62	20	47	14		15	10
Total 8 years	**1,600**	**67**	**42**	**532**	**250**	**369**	**73**	**12**	**112**	**23**

and States, during the year ended Dec. 31, 1918.

Underground—Continued.						Shaft.						
Mine fires. 11	Suffocation from natural gases. 12	Inrush or water. 13	Stepping on nail. 14	Other causes. 15	**Total, underground.**	Falling down shafts. 16	Objects falling down shafts. 17	Breaking of cables. 18	Overwinding. 19	Skip or cage. 20	Other causes. 21	**Total, shaft.**
				1	**17**					7		**7**
		1			**7**					1		**1**
3			1		**49**	3	1			5	5	**14**
	1			1	**33**	5	2	1		3		**11**
				4	**31**	1	1			1		**3**
				2	**11**	1				1	1	**3**
		2			**2**	1						**1**
					3	2						**2**
					2							
		17		2	**82**	5	3			6		**14**
				1	**24**	4				1		**5**
				1	**5**	4				1	1	**6**
				4	**52**	1	1	2		4	1	**9**
					27	1				2		**3**
	1				**1**							
					5	1	3			1		**5**
					8	3				1		**4**
					8	1	2		1	1		**5**
					1	1						**1**
					6	1	2			4		**7**
					1					1		**1**
					7						1	**1**
						1						**1**
				1	**12**	2	2		1			**5**
					4							
	1				**4**	1			1			**2**
3	3	20	1	17	402	39	17	3	3	40	9	**111**
165	6	4		23	605	41	21	4	3	41	12	**122**
27	6	1	2	23	465	45	18	2	2	33	9	**109**
	3	3	1	3	374	34	13	2	1	20	7	**77**
10	1	8		7	366	34	10	2		43	11	**100**
	3			23	458	26	15	2	3	34	10	**90**
1	4	5		8	422	40	12	2		37	9	**100**
37	8	12		10	436	57	18	4			27	**106**
243	34	53	4	114	3,528	316	124	21	12	248	94	815

TABLE 4.—***ALL MINES:*** *Fatalities, by causes*

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams. 22	Railway cars and locomotives. 23	Run or fall of ore in or from ore bins. 24	Fall of persons. 25	Stepping on nail. 26	Hand tools, axes, bars, etc. 27	Electricity. 28	Machinery. 29	Other causes. 30	**Total surface.**
Alabama	1									**1**
Alaska										
Arizona	2						1	2	2	**7**
Arkansas										
California				1					3	**4**
Colorado				1			2		2	**5**
Connecticut										
Florida		1						1		**2**
Georgia										
Idaho		1		1	1					**3**
Illinois										
Iowa										
Kansas				1						**1**
Kentucky										
Maine										
Maryland										
Massachusetts										
Michigan	2	3		1			1	1	2	**10**
Minnesota		1								**1**
Missouri									1	**1**
Montana								1	2	**3**
Nevada							1		2	**3**
New Hampshire										
New Jersey										
New Mexico								1		**1**
New York		1								**1**
North Carolina										
Ohio										
Oklahoma										
Oregon							1			**1**
Pennsylvania										
South Carolina										
South Dakota								1		**1**
Tennessee	1						1	1		**3**
Texas			1			1		1		**3**
Utah							1		1	**2**
Vermont										
Virginia										
Washington										
Wisconsin		1							1	**2**
Wyoming										
Other States										
Total, 1918	**6**	**8**	**1**	**5**	**1**	**1**	**8**	**9**	**16**	**55**
Total, 1917	7	7		13			6	6	26	**65**
Total, 1916	9	5	2	15	1	1	7	12	24	**78**
Total, 1915	4	7	2	3			1	6	25	**48**
Total, 1914	3	7	5	4			6	4	8	**37**
Total, 1913	9	4	2	5	1		5	11	12	**49**
Total, 1912	6	5	2	6			5	11	24	**59**
Total, 1911	4	8	3				2	8	42	**67**
Total 8 years	**43**	**51**	**17**	**51**	**3**	**2**	**40**	**67**	**177**	**458**

and States, during the year ended Dec. 31, 1918—Continued.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	**Total, open pit.**	**Grand total.**
31	32	33	34	35	36	37	38	39	40	41		
												25
												8
1	12	2								1	16	86
		1									1	1
					1		1			4	6	54
												39
	1										1	3
								1			1	1
												17
												3
												6
												2
2		1									3	109
2	18	8	2	1						3	34	64
												12
												64
												33
												1
												10
2											2	15
												14
												2
												13
							1				1	4
1											1	1
												1
	2										2	13
												4
5		3				1					9	28
1											1	5
												8
14	33	15	2	1	1	1	2	1		8	78	646
17	10	23	2	2			1	2		3	60	852
8	15	13	1	2	1		1	2		4	47	697
12	6	19	1	6	1		2	3		4	54	553
18	11	9	1	4	1		5	3		4	56	559
17	12	30	2	2	1		10	5		8	86	683
16	21	20	4	3	2		6	1		7	80	661
35	16	21	1	3	1		3			6	86	695
137	124	150	14	22	8	1	30	17		41	547	5,346

TABLE 5.—***ALL MINES:*** *Injuries, by causes*

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	10
Alabama	150	225	99	125	278	46	31	30	5	26
Alaska	32	29	3	3	7	12	10	20	2	4
Arizona	2,420	1,051	799	139	1,095	269	347	505	26	72
Arkansas	....	....	....	....	....	....	....	....	....	....
California	226	100	123	24	64	15	8	....	1	10
Colorado	151	53	44	16	118	77	4	33	3	9
Connecticut	2	....	1	1	1	....	....	....	....	....
Florida	....	....	....	....	....	....	....	....	....	....
Georgia	1	6	3	....	1	....	....	....	....	....
Idaho	174	90	116	4	61	44	6	72	1	1
Illinois	9	17	3	....	5	....	....	8	....	....
Iowa	7	6	1	....	....	....	....	2	....	....
Kansas	17	13	8	6	14	1	....	12	1	1
Kentucky	8	4	5	....	2	2	....	....	....	....
Maine[a]	....	....	....	....	....	....	....	....	....	....
Maryland	....	....	....	....	....	....	....	....	....	....
Massachusetts	....	....	....	....	....	....	....	....	....	....
Michigan	1,563	983	599	49	785	118	109	276	20	17
Minnesota	556	143	432	57	289	41	21	65	5	32
Missouri	135	404	21	22	277	8	2	111	5	11
Montana	1,383	407	545	23	595	151	5	127	6	4
Nevada	223	130	60	12	153	51	31	86	5	18
New Hampshire	1	....	....	....	1	....	....	....	....	....
New Jersey	32	63	14	4	28	11	4	25	2	....
New Mexico	61	36	25	6	33	1	....	8	....	6
New York	46	213	19	4	96	12	2	86	5	22
North Carolina	1	11	....	....	13	....	....	5	....	2
Ohio[a]	....	....	....	....	....	....	....	....	....	....
Oklahoma	201	233	21	15	71	29	2	158	3	25
Oregon	11	21	4	....	8	35	3	10	1	....
Pennsylvania	....	....	....	....	2	....	....	....	....	....
South Carolina[a]	....	....	....	....	....	....	....	....	....	....
South Dakota	26	206	23	7	48	6	....	35	1	....
Tennessee	60	86	13	6	61	2	2	22	12	1
Texas	....	....	....	....	....	....	....	....	....	....
Utah	340	115	126	16	217	67	24	145	12	17
Vermont	3	11	5	....	4	2	2	4	....	....
Virginia	24	22	7	2	17	1	3	5	....	1
Washington	8	2	....	1	3	....	....	5	....	4
Wisconsin	101	140	34	13	83	9	5	26	2	11
Wyoming	1	....	....	....	1	....	....	....	....	....
Other States	....	2	....	....	2	....	....	....	....	1
Total, 1918[b]	7,973	4,822	3,153	555	4,433	1,010	621	1,881	118	295

[a] Not segregated.

[b] For totals 1911 to 1917, see Table 18.

and States, during the year ended Dec. 31, 1918.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
......	......	......	......	237	**1,252**	1	7	1	......	43	6	**58**
......	1	1	......	33	157	......	1	......	......	2	......	**3**
3	29	1	273	1,988	**9,017**	10	16	9	......	36	29	**100**
......	......	......	......	......	......	......	......	......	......	......	......	......
......	5	135	25	528	**1,264**	6	13	2	......	18	22	**61**
......	......	......	11	128	**647**	2	3	......	......	11	9	**25**
......	......	......	......	......	**5**	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	3	......	**14**	......	......	......	......	......	......	......
......	1	......	23	141	**737**	2	5	......	......	2	6	**15**
......	......	......	1	6	**49**	......	......	......	......	......	1	**1**
......	......	......	1	16	**33**	......	......	......	......	......	......	......
......	......	......	5	14	**92**	......	4	......	......	5	7	**16**
......	......	......	4	2	**27**	......	2	......	......	1	......	**3**
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	82	763	**5,364**	9	49	......	......	58	66	**182**
......	2	1	69	369	**2,082**	4	10	......	......	16	36	**66**
......	1	3	33	215	**1,248**	4	13	......	......	12	18	**47**
1	4	......	81	539	**3,871**	2	83	1	......	49	54	**189**
......	......	......	23	142	**934**	3	9	......	......	16	6	**34**
......	......	......	......	......	**2**	......	......	......	......	......	......	......
......	......	......	4	47	**234**	4	14	2	......	4	15	**39**
......	......	......	5	21	**202**	4	5	......	......	2	4	**15**
......	......	......	10	143	**658**	......	3	1	......	3	2	**9**
......	......	......	......	7	**39**	1	......	......	......	......	......	**1**
......	......	......	......	......	......	......	......	......	......	......	......	......
......	9	......	39	158	**964**	13	45	1	......	59	21	**139**
......	......	......	8	8	**109**	......	2	......	......	1	......	**3**
......	......	......	......	......	**2**	......	......	......	......	1	......	**1**
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	102	**454**	1	2	......	1	1	3	**8**
......	......	......	6	16	**287**	......	5	......	......	5	4	**14**
......	......	......	......	36	**36**	......	......	......	......	......	1	**1**
......	1	2	43	226	**1,351**	1	7	1	1	23	9	**42**
......	......	......	......	1	**32**	......	......	......	......	......	1	**1**
......	......	......	3	3	**88**	1	......	......	......	2	1	**4**
......	......	......	......	......	**23**	......	......	......	......	......	......	......
......	3	......	16	123	**566**	3	9	......	......	18	7	**37**
......	......	......	......	......	**2**	......	......	......	......	......	......	......
......	......	......	......	6	**11**	......	......	......	......	......	......	......
4	56	143	768	6,021	31,853	71	307	18	2	388	328	1,114

TABLE 5.—*ALL MINES: Injuries, by causes*

State.	Surface (shops and yards).									
	Mine cars, mone locomotives, or aerial trams. 22	Railway cars and locomotives. 23	Run or fall of ore in or from ore bins. 24	Falls of persons. 25	Stepping on nail. 26	Hand tools, axes, bars, etc. 27	Electricity. 28	Machinery. 29	Other causes. 30	**Total surface.**
Alabama	27	5	......	19	3	6	......	21	42	**123**
Alaska	2	6	......	5	2	3	2	3	22	**45**
Arizona	67	22	14	63	49	93	24	66	506	**904**
Arkansas	......	......	......	......	......	......	......	......	......	......
California	25	11	......	176	171	152	5	186	921	**1,647**
Colorado	21	......	......	36	8	14	5	19	74	**177**
Connecticut	......	......	......	......	......	......	......	......	......	......
Florida	1	6	......	5	10	18	8	8	67	**123**
Georgia	......	......	......	......	......	......	......	......	......	......
Idaho	6	......	6	15	7	9	2	16	43	**104**
Illinois	3	......	......	4	1	4	......	1	9	**22**
Iowa	......	......	......	2	4	......	......	2	6	**14**
Kansas	2	1	......	5	4	3	......	8	11	**34**
Kentucky	2	7	......	......	3	1	......	3	1	**17**
Maine [a]	......	......	......	......	......	......	......	......	......	......
Maryland	......	......	......	......	......	......	......	......	......	......
Massachusetts	......	......	......	......	......	......	......	......	......	......
Michigan	26	16	24	101	36	141	1	77	377	**799**
Minnesota	26	18	7	49	26	93	2	51	285	**557**
Missouri	1	12	8	11	13	14	2	37	162	**260**
Montana	17	2	5	81	6	107	1	32	80	**331**
Nevada	37	6	2	18	3	14	3	26	65	**174**
New Hampshire	......	......	......	......	......	......	......	......	......	......
New Jersey	......	1	1	4	2	5	......	5	31	**49**
New Mexico	14	7	1	6	9	21	1	15	78	**152**
New York	5	4	4	14	13	16	3	17	68	**144**
North Carolina	......	2	......	1	......	1	......	......	5	**9**
Ohio [a]	......	......	......	......	......	......	......	......	......	......
Oklahoma	19	......	4	12	19	15	2	14	80	**165**
Oregon	1	......	......	......	......	2	......	......	1	**4**
Pennsylvania	......	1	......	1	1	4	......	......	3	**10**
South Carolina [a]	......	......	......	......	......	......	......	......	......	......
South Dakota	1	......	......	1	......	......	......	2	10	**14**
Tennessee	8	16	1	8	5	5	......	10	43	**96**
Texas	2	......	......	......	15	25	5	38	111	**196**
Utah	16	9	5	11	9	23	1	16	82	**172**
Vermont	1	......	2	1	2	1	......	3	3	**13**
Virginia	10	4	......	2	1	3	......	5	9	**34**
Washington	3	......	......	......	......	1	......	1	13	**18**
Wisconsin	10	1	6	7	7	16	2	9	60	**118**
Wyoming	......	......	......	......	......	......	......	......	......	......
Other States	35	7	......	14	22	18	......	7	60	**163**
Total, 1918	**388**	**164**	**90**	**672**	**451**	**828**	**69**	**698**	**3,328**	**6,688**

[a] Not segregated.

and States, during the year ended Dec. 31, 1918—Continued.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	**Total, open pit.**	**Grand total.**
31	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**	**41**		**1918**
4	1	23	8	14	......	1	6	......	6	40	**103**	**1,536**
......	......	......	......	1	......	......	......	......	......	......	**1**	**206**
101	32	12	20	31	1	......	17	......	45	180	**439**	**10,460**
21	......	13	......	2	......	......	......	......	......	......	**36**	**36**
1	1	6	2	37	21	6	16	3	23	72	**188**	**3,160**
......	......	......	......	......	......	......	......	......	......	......	......	**849**
......	......	......	......	......	......	......	......	......	......	......	......	**5**
2	19	......	1	6	......	......	10	2	4	44	**88**	**211**
......	......	2	......	......	......	......	......	......	1	......	**3**	**17**
......	......	......	......	1	......	1	3	......	2	5	**12**	**868**
......	......	......	......	......	......	......	......	......	......	......	......	**72**
......	......	......	......	......	......	......	......	......	......	......	......	**47**
......	......	......	......	......	......	......	......	......	......	......	......	**142**
......	......	......	......	......	......	......	......	......	......	......	......	**47**
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	1	......	......	......	......	......	......	......	......	**1**	**1**
14	4	31	17	17	......	3	5	......	35	72	**198**	**6,543**
143	24	195	127	71	9	2	26	1	101	429	**1,128**	**3,833**
1	......	......	8	1	......	......	......	......	......	1	**11**	**1,566**
6	......	......	......	......	......	......	2	......	......	2	**10**	**4,401**
8	1	8	7	3	1	......	......	......	3	18	**49**	**1,191**
......	......	......	......	......	......	......	......	......	......	......	......	**2**
......	......	......	......	1	......	......	......	......	......	2	**3**	**325**
40	7	46	21	36	1	2	24	......	30	93	**300**	**669**
2	......	2	......	2	......	......	......	......	1	9	**16**	**827**
......	......	......	......	2	......	......	......	......	......	......	**2**	**51**
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	3	**3**	**1,271**
......	......	......	......	1	......	1	2	......	3	1	**8**	**124**
1	......	......	......	......	......	......	3	......	......	......	**4**	**17**
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......	**476**
4	8	5	1	1	......	......	1	......	2	17	**39**	**436**
......	......	......	......	......	......	......	......	......	......	......	......	**233**
134	5	68	28	43	1	1	11	......	50	213	**554**	**2,119**
......	......	......	......	......	......	......	......	......	......	......	......	**46**
6	......	5	5	4	......	......	......	......	......	6	**26**	**152**
7	......	1	......	1	......	......	......	......	......	15	**24**	**65**
......	......	......	......	......	......	......	......	......	......	......	......	**721**

6	......	1	......	3	......	......	......	......	......	3	**13**	**15**
......	......	1	......	......	......	......	......	......	......	......	**1**	**175**
501	**102**	**420**	**245**	**278**	**34**	**17**	**126**	**6**	**306**	**1,225**	**3,260**	**42,915**

ACCIDENT STATISTICS BY GROUPS OF MINES.

COPPER MINES.

The figures for copper mines in Tables 6 and 7 are compiled from reports of 524 operators that employed 59,447 men, of whom 42,286 worked underground and 17,161 on the surface, not including employees at copper metallurgical works. The total days' labor performed during the year was about 20,000 more than in 1917, whereas the number of employees was about 1,800 less.

The total number of deaths and injuries from accidents and the rates per 1,000 300-day workers are as follows: Deaths, 220, or 3.45 per 1,000, as compared with 5.88 for 1917; injuries, 20,513 (table 18), or 322.12 per 1,000, as compared with 313.35 for 1917. Of the total number of fatalities, 180 were underground and 40 on the surface. The 1917 fatality rate was augmented abnormally by the disastrous fire at the North Butte mine, Butte, Mont., June 8, 1917, in which 161 men lost their lives.

The seemingly high rates of nonfatal injuries for this group of mines are not due so much to greater hazards in copper mines as to the fact that accurate records are kept by well-organized companies, practically all of which have a safety department in charge of a competent engineer. It is believed that the accident records shown by both the copper and iron mines represent more nearly the actual hazard in the metal-mining industry of the United States than do the records of any other group. This statement is substantiated by the data shown in Table 22, in which the nonfatal accident rates, derived from representative mining operations, were, respectively, 318.52 (1917) and 322.91 (1918) per 1,000 300-day workers.

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

The data on accidents in and about the gold, silver, and miscellaneous metal mines, shown in Tables 8 and 9, are compiled from the reports of 2,429 operators, employing 43,643 men, of whom 28,061 were employed underground and 15,582 on the surface. The number of employees at this group of mines was about 7,800 less than in 1917 and 16,000 less than in 1916. The rapid decline in the number of employees shows a marked decadence in this group of mines, especially those mines whose principal product is gold. Some of this decline may be attributed to the war, many men being drafted for military service. The greatest cause, however, is the excessively high cost of mining supplies and of labor, which caused the suspension of many small mines and the actual closing of some of the larger low-grade mines. The number of deaths and injuries from accidents and the rates per 1,000 300-day employees are as follows:

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Deaths 181, or 4.27 per 1,000, as compared with 4.03 in 1917; injuries (Table 18) 7,847, or 185.18 per 1,000, as compared with 172.51 for 1917. Of the total number of fatalities, 152 were underground, or 5.29 per 1,000, and 29 on the surface, or 2.12 per 1,000.

The rates on nonfatal injuries are low as compared with those at iron and copper mines. The difference may be explained largely by this group including many prospects and small mines that keep no records, and by many of the mines being in States where there is no inspection and the operators are not required to report accidents. At such mines any accidents that are not serious are forgotten, and therefore not reported at the close of the year.

IRON MINES.

The figures on accidents at iron mines given in Tables 10 and 11 are compiled from the reports of 176 iron-mine operators, who employed 53,665 men, of whom 28,775 were employed underground and 24,890, including those engaged in steam-shovel work, on the surface.

The number of deaths and injuries from accidents in these mines is as follows: Deaths, 179, or 3.45 per 1,000 300-day employees, as compared with 3.54 in 1917; injuries (Table 18), 9,621, or 185.45 per 1,000, as compared with 227.54 in 1917. Of the total number of fatalities, 128 occurred underground, or 4.49 per 1,000 300-day workers underground; and 51 employees were killed while engaged in surface work, making this rate 2.18 per 1,000 300-day workers on the surface.

Compared with the records of 1911, there is a small decrease in the accidents, both fatal and nonfatal, regardless of the conditions prevailing during the stress of war.

LEAD AND ZINC MINES.

Only the lead and zinc mines in the Mississippi Valley are included in this group. The lead and zinc mines of other States are grouped with "gold, silver and miscellaneous metal mines" on account of the difficulty of making distinct classifications. In many places, for instance in the lead-silver mines in the Coeur d'Alene district of Idaho, lead and zinc occur as associated metals in silver ores. The Mississippi Valley lead and zinc mines form a class by themselves and are easily segregated.

The figures given in Tables 12 and 13 are compiled from the reports of 236 operators, employing 14,004 men of whom 10,344 were employed underground and 3,660 on the surface.

The total number of deaths and injuries due to accidents as reported is as follows: Deaths, 47, or 3.58 per 1,000 300-day employees, as compared with 4.09 in 1917; injuries (Table 18), 3,746, or 319.54 per 1,000 as compared with 272.99 in 1917. Of the total number of fatalities, 43 occurred underground, making the rate 4.33 per 1,000; the surface fatailties were 4 or 1.36 per 1,000 300-day workers.

NONMETALLIC MINERAL MINES.

Tables 14 and 15 represent reports of 271 operators of nonmetallic mineral mines. These mines employed 11,847 men, of whom 2,690 worked underground and 9,157 on the surface. This group is the only one in which an increase in the number of employees is shown for the year 1918, as compared with 1917. This may be accounted for largely by the increased demand for domestic nonmetallic minerals brought about by war conditions shutting off imports of barite, magnesite, gypsum, graphite, etc.

The total number of reported deaths and injuries from accidents is as follows: Deaths, 19, or 1.67 per 1,000 300-day workers, as compared with 2.48 in 1917; injuries (Table 18), 1,188, or 104.69 per 1,000 as compared with 123.58 in 1917. Compared with the nonfatal-injury rates for the copper and iron mines, these ratios seem exceedingly low; the reports indicate that this difference is largely explainable by the mines being small and not keeping complete records. About 75 per cent of the men are employed on the surface, the hazards being thus reduced to those of quarry operations.

TABLE 6.—**COPPER MINES:** *Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1918.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**		Under-ground.	Surface.	**Total.**		
Alaska	15	389	227	**616**	128,187	76,172	**204,359**	332	2	....	**2**	2	4
Arizona	179	12,989	4,599	**17,588**	4,438,435	1,546,910	**5,985,345**	340	59	21	**80**	34	62
California	33	1,171	693	**1,864**	351,443	207,807	**559,250**	300	6	2	**8**	....	....
Idaho	35	299	106	**405**	90,678	28,974	**119,652**	295	1	....	**1**	....	....
Michigan	30	9,505	5,481	**14,986**	2,911,882	1,677,712	**4,589,594**	306	40	2	**42**	19	44
Montana	36	13,585	1,059	**14,644**	4,155,023	319,795	**4,474,818**	306	50	2	**52**	24	47
Nevada	62	1,305	1,251	**2,556**	469,830	450,540	**920,370**	360	12	....	**12**	1	3
New Mexico	27	877	1,362	**2,239**	250,220	471,238	**721,458**	322	3	2	**5**	3	4
Oregon	13	124	48	**172**	38,050	13,090	**51,140**	297	....	1	**1**	....	....
Utah	43	1,500	2,034	**3,534**	513,542	729,094	**1,242,636**	352	4	9	**13**	8	10
Washington	33	126	70	**196**	27,561	14,747	**42,308**	216	....	....	....	....	....
Other States	18	416	231	**647**	125,615	67,633	**193,248**	299	3	1	**4**	2	3
Total, 1918	**524**	**42,286**	**17,161**	**59,447**	**13,500,466**	**5,603,712**	**19,104,178**	**321**	**180**	**40**	**220**	**93**	**177**
Total, 1917	649	43,715	17,560	**61,275**	13,804,702	5,280,861	**19,085,563**	312	352	22	**374**	142	336
Total, 1916	604	43,215	18,013	**61,228**	13,362,392	5,569,750	**18,932,142**	309	188	42	**230**	84	157
Total, 1915	548	32,421	14,753	**47,174**	9,766,986	4,444,414	**14,211,400**	301	143	33	**176**	99	186
Total, 1914	585	31,265	13,421	**44,686**	8,987,171	3,857,887	**12,845,058**	287	147	18	**165**	69	106
Total, 1913	694	39,917	16,222	**56,139**	12,350,220	5,019,046	**17,369,266**	327	203	33	**236**	100	180
Total, 1912	814	37,539	14,237	**51,776**	11,478,084	4,353,166	**15,831,250**	306	185	54	**239**	87	159
Total, 1911	396	31,557	13,136	**44,693**	9,725,827	4,048,498	**13,774,325**	308	199	39	**238**	91	195

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TABLE 7.—***COPPER MINES:*** *Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**
Alaska	427	254	**681**	4.68	....	**2.94**	....	....	....
Arizona	14,795	5,156	**19,951**	3.99	4.07	**4.01**	....	....	....
California	1,171	693	**1,864**	5.12	2.89	**4.29**	....	....	....
Idaho	302	97	**399**	3.31	....	**2.51**	....	....	....
Michigan	9,706	5,593	**15,299**	4.12	.36	**2.75**	....	....	....
Montana	13,850	1,066	**14,916**	3.61	1.88	**3.49**	....	....	....
Nevada	1,566	1,502	**3,068**	7.66	....	**3.91**	....	....	....
New Mexico	834	1,571	**2,405**	3.60	1.27	**2.07**	....	....	....
Oregon	127	44	**171**	....	22.73	**5.85**	....	....	....
Utah	1,712	2,430	**4,142**	2.34	3.70	**3.14**	....	....	....
Washington	92	49	**141**	....	....	....	....	....	....
Other States	419	225	**644**	7.16	4.44	**6.21**	....	....	....
Total, 1918	**45,001**	**18,680**	**63,681**	**4.00**	**2.14**	**3.45**	**382.24**	**177.30**	**322.12**
Total, 1917	46,016	17,603	**63,619**	7.65	1.25	**5.88**	359.27	193.32	**313.35**
Total, 1916	44,541	18,566	**63,107**	4.22	2.26	**3.64**	373.66	189.86	**319.58**
Total, 1915	32,556	14,815	**47,371**	4.39	2.23	**3.72**	384.74	184.15	**322.01**
Total, 1914	29,957	12,860	**42,817**	4.91	1.40	**3.85**	368.49	181.03	**312.19**
Total, 1913	41,168	16,730	**57,898**	4.93	1.97	**4.08**	265.69	144.95	**230.80**
Total, 1912	38,260	14,511	**52,771**	4.84	3.72	**4.53**	307.84	128.11	**258.42**
Total, 1911	32,419	13,495	**45,914**	6.14	2.89	**5.18**	271.32	114.56	**225.25**

TABLE 8.—***GOLD, SILVER, AND MISCELLANEOUS METAL MINES:*** *Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1918.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**		Under-ground.	Surface.	**Total.**		
Alaska	254	1,840	3,044	**4,884**	580,725	589,487	**1,170,212**	240	6	....	**6**	1	4
Arizona	137	1,127	605	**1,732**	309,331	156,404	**465,735**	269	4	2	**6**	3	4
California	315	3,404	3,057	**6,461**	1,021,156	917,172	**1,938,328**	300	37	8	**45**	....	....
Colorado	450	6,949	1,474	**8,423**	2,084,696	442,239	**2,526,935**	300	34	5	**39**	....	....
Georgia	7	55	90	**145**	17,380	22,275	**39,655**	273	....	....	....	....	....
Idaho	245	2,846	1,184	**4,030**	816,659	303,108	**1,119,767**	278	13	3	**16**	6	7
Montana	178	2,293	894	**3,187**	738,608	256,957	**995,565**	312	11	1	**12**	5	13
Nevada	342	2,063	945	**3,008**	742,530	340,200	**1,082,730**	360	18	3	**21**	4	1
New Mexico	60	779	445	**1,224**	199,261	118,419	**317,680**	260	5	1	**6**	3	2
New York[a]	....	....	....	....	....	....	....	....	....	....	....	....	....
North Carolina	6	11	61	**72**	2,940	10,350	**13,290**	185	....	....	....	....	....
Oregon	125	554	551	**1,105**	111,594	86,812	**198,406**	180	2	1	**3**	2	3
South Dakota	38	955	515	**1,470**	353,963	136,998	**490,961**	334	....	1	**1**	....	....
Tennessee	5	16	66	**82**	2,360	12,004	**14,364**	175	....	....	....	....	....
Utah	125	2,600	663	**3,263**	871,127	203,148	**1,074,275**	329	13	2	**15**	9	22
Virginia	22	304	595	**899**	82,512	136,386	**218,898**	243	....	1	**1**	1	4
Washington	76	245	152	**397**	38,427	27,128	**65,555**	165	....	....	....	....	....
Wyoming	16	26	27	**53**	2,070	2,286	**4,356**	82	....	....	....	....	....
Other States	28	1,994	1,214	**3,208**	641,199	334,645	**975,844**	304	9	1	**10**	6	12
Total, 1918	**2,429**	**28,061**	**15,582**	**43,643**	**8,616,538**	**4,096,018**	**12,712,556**	**197**	**152**	**29**	**181**	**40**	**72**
Total, 1917	3,166	35,812	16,080	**51,892**	10,341,808	4,240,003	**14,581,811**	281	166	30	**196**	41	60
Total, 1916	3,921	42,158	17,949	**60,107**	11,286,467	4,805,275	**16,091,742**	268	190	27	**217**	71	116
Total, 1915	3,120	29,163	16,149	**45,312**	8,027,472	4,445,210	**12,472,682**	275	168	31	**199**	77	133
Total, 1914	3,536	35,432	13,006	**48,438**	96,85,888	3,555,392	**13,241,280**	273	154	25	**179**	60	87
Total, 1913	4,749	44,810	14,691	**59,501**	12,376,094	4,057,514	**16,433,608**	276	180	30	**210**	67	70
Total, 1912	4,137	31,322	12,822	**44,144**	8,677,523	3,552,238	**12,229,761**	277	147	29	**176**	71	98
Total, 1911	3,817	35,176	13,743	**48,919**	9,716,478	3,796,155	**13,512,633**	276	163	30	**193**	61	118

[a] Not segregated.

TABLE 9.—***GOLD, SILVER, AND MISCELLANEOUS METAL MINES:*** *Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Under-ground.	Surface.	Total.	Under-ground.	Surface.	Total.	Under-ground.	Surface.	Total.
Alaska	1,936	1,965	3,901	3.10	....	1.54	....	....	....
Arizona	1,031	521	1,552	3.88	3.84	3.87	....	....	....
California	3,404	3,057	6,461	10.87	2.62	6.96	....	....	....
Colorado	6,949	1,474	8,423	4.89	3.39	4.63	....	....	....
Georgia	58	74	132	....	....	....	....	....	....
Idaho	2,722	1,010	3,732	4.78	2.97	4.29	....	....	....
Montana	2,462	857	3,319	4.47	1.17	3.62	....	....	....
Nevada	2,475	1,134	3,609	7.27	2.65	5.82	....	....	....
New Mexico	664	395	1,059	7.53	2.53	5.67	....	....	....
New York[a]	....	....	....	....	....	....	....	....	....
North Carolina	10	34	44	....	....	....	....	....	....
Oregon	372	289	661	5.38	3.46	4.54	....	....	....
South Dakota	1,180	457	1,637	....	2.19	.61	....	....	....
Tennessee	8	40	48	....	....	....	....	....	....
Utah	2,904	677	3,581	4.48	2.95	4.19	....	....	....
Virginia	275	455	730	....	2.20	1.37	....	....	....
Washington	128	90	218	....	....	....	....	....	....
Wyoming	7	8	15	....	....	....	....	....	....
Other States	2,137	1,116	3,253	4.21	.90	3.07	....	....	....
Total, 1918	28,722	13,653	42,375	5.29	2.12	4.27	189.02	177.10	185.18
Total, 1917	34,473	14,133	48,606	4.82	2.12	4.03	207.23	87.81	172.51
Total, 1916	37,621	16,018	53,639	5.05	1.69	4.05	221.29	119.18	190.79
Total, 1915	26,758	14,818	41,576	6.28	2.09	4.79	261.23	93.60	201.49
Total, 1914	32,286	11,852	44,138	4.77	2.11	4.06	144.21	79.73	126.90
Total, 1913	41,254	13,525	54,779	4.36	2.22	3.83	80.60	39.19	70.37
Total, 1912	28,925	11,841	40,766	5.08	2.45	4.32	114.47	40.71	93.04
Total, 1911	32,388	12,654	45,042	5.03	2.37	4.28	99.79	30.50	80.33

[a] Not segregated.

TABLE 10.—***IRON MINES:*** *Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1918.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**		Under-ground.	Surface.	**Total.**		
Alabama	19	4,688	**2,900**	**7,588**	**1,487,513**	818,651	**2,306,164**	304	24	1	**25**	11	38
Georgia	7	208	235	**443**	54,944	45,064	**100,008**	226	....	....	....	....	....
Michigan	36	11,949	6,108	**18,057**	3,470,510	1,764,740	**5,235,250**	290	56	11	**67**	38	110
Minnesota	57	7,851	11,803	**19,654**	2,352,715	3,324,301	**5,677,016**	289	28	35	**63**	41	103
Missouri	4	44	78	**122**	10,411	17,705	**28,116**	230	....	....	....	....	....
New Jersey	4	691	484	**1,175**	202,023	140,921	**342,944**	292	7	....	**7**	5	17
New Mexico	3	90	385	**475**	6,900	111,825	**118,725**	250	4	....	**4**	2	8
New York	9	1,340	827	**2,167**	395,188	237,188	**632,376**	292	6	1	**7**	1	2
Pennsylvania [a]	....	....	....	....	....	....	....	....	....	....	....	....	....
Tennessee	10	224	729	**953**	62,960	169,334	**232,294**	244	....	2	**2**	1	3
Virginia	8	434	594	**1,028**	128,262	160,397	**288,659**	281	1	....	**1**	1	1
Wisconsin	6	924	305	**1,229**	283,917	91,012	**374,929**	305	2	....	**2**	1	....
Other States	13	332	442	**774**	99,080	127,771	**226,851**	293	....	1	**1**	1	....
Total, 1918	**176**	**28,775**	**24,890**	**53,665**	**8,554,423**	**7,008,909**	**15,563,332**	**290**	**128**	**51**	**179**	**102**	**282**
Total, 1917	205	31,549	25,681	**57,230**	9,309,613	6,878,438	**16,188,051**	283	135	56	**191**	85	190
Total, 1916	199	30,485	23,003	**53,488**	8,474,524	6,394,603	**14,869,127**	278	133	36	**169**	88	222
Total, 1915	191	23,302	16,089	**39,391**	6,336,042	4,374,756	**10,710,798**	272	78	25	**103**	67	127
Total, 1914	196	24,847	19,960	**44,807**	6,513,543	5,232,435	**11,745,978**	262	120	28	**148**	86	178
Total, 1913	206	29,384	21,749	**51,133**	8,656,898	6,407,531	**15,064,429**	295	122	43	**165**	81	178
Total, 1912	194	26,799	18,947	**45,746**	7,636,470	5,399,015	**13,035,485**	285	136	36	**172**	84	198
Total, 1911	207	25,461	20,492	**45,953**	7,063,856	5,685,265	**12,749,121**	277	136	61	**197**	114	237

[a] Not segregated.

TABLE 11.—***IRON MINES:*** *Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**
Alabama	4,958	2,729	7,687	4.84	0.37	**3.25**	....	....	....
Georgia	183	150	333	....	....	....	....	....	....
Michigan	11,568	5,883	17,451	4.84	1.87	3.84	....	....	....
Minnesota	7,842	11,081	**18,923**	3.57	3.16	3.33	....	....	....
Missouri	35	59	**94**	....	....	....	....	....	....
New Jersey	674	470	**1,144**	10.39	....	6.12	....	....	....
New Mexico	23	373	396	173.91	....	**10.10**	....	....	....
New York	1,317	791	**2,108**	4.56	1.26	3.32	....	....	....
Pennsylvania[a]	....	....	....	....	....	....	....	....	....
Tennessee	210	564	**774**	....	3.55	**2.58**	....	....	....
Virginia	427	535	**962**	2.34	....	**1.04**	....	....	....
Wisconsin	947	303	**1,250**	2.11	....	**1.60**	....	....	....
Other States	330	426	**756**	....	2.35	**1.32**	....	....	....
Total, 1918	**28,515**	**23,363**	51,878	**4.49**	**2.18**	3.45	**240.50**	**118.26**	185.45
Total, 1917	31,032	22,928	53,960	4.35	2.44	3.54	285.90	148.55	**227.54**
Total, 1916	28,248	21,316	49,564	4.71	1.69	3.41	327.32	124.70	**240.17**
Total, 1915	21,120	14,583	35,703	3.69	1.71	2.88	313.97	116.99	**233.51**
Total, 1914	21,712	17,441	39,153	5.53	1.61	3.78	303.29	125.45	**224.07**
Total, 1913	28,856	21,359	50,215	4.23	2.01	3.29	341.84	168.98	**268.31**
Total, 1912	25,455	17,997	43,452	5.34	2.00	3.96	308.54	147.41	**241.81**
Total, 1911	23,546	18,951	**42,497**	5.78	3.22	**4.64**	333.14	151.87	**252.30**

[a] Not segregated.

TABLE 12.—***LEAD AND ZINC MINES*** (*Mississippi Valley*): *Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1918.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**		Under-ground.	Surface.	**Total.**		
Arkansas	18	145	106	**251**	20,980	12,512	**33,492**	133	......	......	......	......	......
Illinois	7	421	234	**655**	115,101	55,753	**170,854**	261	3	......	**3**	3	6
Kansas	21	650	317	**967**	128,129	74,331	**202,460**	209	5	1	**6**	5	13
Missouri	83	4,554	1,143	**5,697**	1,206,300	273,129	**1,479,429**	260	11	1	**12**	9	17
Oklahoma	49	2,630	872	**3,502**	628,806	203,765	**832,571**	238	13	......	**13**	8	17
Tennessee	4	605	224	**829**	183,760	68,959	**252,719**	305	5	1	**6**	2	2
Wisconsin	42	1,162	618	**1,780**	295,405	153,120	**448,525**	252	4	1	**5**	1	2
Other States	12	177	146	**323**	54,902	42,051	**96,953**	300	2	......	**2**	1	2
Total, 1918	**236**	**10,344**	**3,660**	**14,004**	**2,633,383**	**833,620**	**3,517,003**	**251**	**43**	**4**	**47**	**29**	**59**
Total, 1917	369	15,075	5,194	**20,269**	3,733,344	1,260,046	**4,993,390**	246	65	3	**68**	43	82
Total, 1916	285	14,687	5,928	**20,615**	3,877,523	1,565,055	**5,442,578**	264	52	5	**57**	31	61
Total, 1915	241	9,493	3,484	**12,977**	2,450,891	899,495	**3,350,386**	258	54	6	**60**	23	28
Total, 1914	248	7,609	3,326	**10,935**	1,933,813	845,296	**2,779,109**	254	37	3	**40**	23	53
Total, 1913	409	9,261	3,436	**12,697**	2,353,484	873,185	**3,226,669**	254	32	10	**42**	25	46
Total, 1912	464	10,812	3,520	**14,332**	2,853,837	929,107	**3,782,944**	265	48	6	**54**	26	62
Total, 1911	483	9,247	3,274	**12,521**	2,364,989	837,350	**3,202,339**	256	32	11	**43**	26	40

TABLE 13.—***LEAD AND ZINC MINES*** (*Mississippi Valley*): *Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**	Under-ground.	Surface.	**Total.**
Arkansas	70	42	**112**						
Illinois	384	186	**570**						
Kansas	427	248	**675**	11.71	403	**8.89**			
Missouri	4,021	910	**4,931**	2.74	1.10	**2.43**			
Oklahoma	2,096	679	**2,775**	6.20		**4.68**			
Tennessee	612	230	**842**	8.17	4.35	**7.13**			
Wisconsin	985	510	**1,495**	4.06	1.96	**3.34**			
Other States	183	140	**323**						
Total, 1918	**8,778**	**2,945**	**11,723**	**4.33**	**1.36**	**3.58**	**358.28**	**204.07**	**319.54**
Total, 1917	12,444	4,200	**16,644**	5.22	.71	**4.09**	303.50	182.62	**272,99**
Total, 1916	12,925	5,217	**18,142**	4.02	.96	**3.14**	297.41	178.07	**263.09**
Total, 1915	8,170	2,998	**11,168**	6.61	2.00	**5.37**	290.09	97.06	**238.27**
Total, 1914	6,446	2,818	**9,264**	5.74	1.06	**4.32**	228.82	97.94	**189.01**
Total, 1913	7,845	2,911	**10,756**	4.08	3.44	**3.90**	145.44	101.34	**133.51**
Total, 1912	9,513	3,097	**12,610**	5.05	1.94	**4.28**	183.75	80.08	**158.29**
Total, 1911	7,883	2,791	**10,674**	4.06	3.94	**4.03**	164.91	67.36	**139.40**

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TABLE 14.—*NONMETALLIC MINERAL MINES: Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1918.*

State.	Number of active operators reporting.	Number of employees.			Days of labor performed.			Average number of days worked.	Number killed.			Widows.	Orphans.
		Under-ground.	Surface.	Total.	Under-ground.	Surface.	Total.		Under-ground.	Surface.	Total.		
California	41	628	797	1,425	188,491	239,041	427,532	300	1		1		
Florida	14		2,582	2,582		821,690	821,690	318		3	3	3	4
Georgia	6	53	104	157	17,490	23,080	40,570	258		1	1	1	
Iowa	5	221	127	348	45,951	29,206	75,157	216					
Maine[a]													
Michigan	4	121	72	193	30,973	18,244	49,217	255					
New York	20	769	556	1,325	214,644	149,332	363,976	275	4		4	3	4
North Carolina	17	52	237	289	12,332	45,325	57,657	200	2		2	1	1
Ohio[a]													
Pennsylvania	14	32	95	127	8,510	19,970	28,480	224					
Tennessee	12	70	1,142	1,212	17,150	275,177	292,327	241		1	1	1	6
Utah	8	60	34	94	19,070	11,207	30,277	322					
Vermont	5	64	25	89	18,705	6,651	25,356	285					
Virginia	8	78	128	206	22,916	35,916	58,832	286	3		3	3	7
Other States	117	542	3,258	3,800	131,289	1,002,319	1,133,608	298		4	4	2	3
Total, 1918	**271**	**2,690**	**9,157**	**11,847**	**727,521**	**2,677,158**	**3,404,679**	**287**	**10**	**9**	**19**	**14**	**25**
Total, 1917	248	2,726	7,187	9,913	855,138	1,921,858	2,776,996	280	9	14	23	15	28
Total, 1916	249	2,618	6,629	9,247	679,722	1,721,114	2,400,836	260	11	13	24	11	18
Total, 1915	222	1,844	5,420	7,264	470,583	1,383,166	1,853,749	255	8	7	15	9	10
Total, 1914	240	2,465	6,784	9,249	580,285	1,597,021	2,177,306	235	8	19	27	14	18
Total, 1913	329	2,997	8,809	11,806	757,471	2,226,412	2,983,883	253	11	19	30	13	27
Total, 1912	358	3,584	9,617	13,201	982,558	2,636,512	3,619,070	274	6	14	20	5	3
Total, 1911	329	3,182	10,711	13,893	21,817	2,766,338	3,588,155	258	12	12	24	5	10

[a] Not segregated.

TABLE 15.—***NONMETALLIC MINERAL MINES:*** *Fatalities and injuries per 1,000 300-day workers.*

State.	Number of 300-day workers.			Killed per 1,000 300-day workers.			Injured per 1,000 300-day workers.		
	Underground.	Surface.	**Total.**	Underground.	Surface.	**Total.**	Underground.	Surface.	**Total.**
California	628	797	**1,425**	1.59	....	**0.70**	....	....	....
Florida	....	2,739	**2,739**	....	1.10	**1.10**	....	....	....
Georgia	58	77	**135**	....	12.99	**7.41**	....	....	....
Iowa	153	97	**250**	....	....	....	....	....	....
Maine [a]	....	....	....	....	....	....	....	....	....
Michigan	103	61	**164**	....	....	....	....	....	....
New York	715	498	**1,213**	5.59	....	**3.30**	....	....	....
North Carolina	41	151	**192**	48.78	....	**10.42**	....	....	....
Ohio [a]	....	....	....	....	....	....	....	....	....
Pennsylvania	28	67	**95**	....	....	....	....	....	....
Tennessee	58	917	**975**	....	1.09	**1.03**	....	....	....
Utah	64	37	**101**	....	....	....	....	....	....
Vermont	63	22	**85**	....	....	....	....	....	....
Virginia	76	120	**196**	39.47	....	**15.31**	....	....	....
Other States	438	3,341	**3,779**	....	1.20	**1.06**	....	....	....
Total, 1918	**2,425**	**8,924**	**11,349**	**4.12**	**1.01**	**1.67**	**137.79**	**95.70**	**104.69**
Total, 1917	2,850	6,406	**9,256**	3.16	2.19	**2.48**	150.82	111.46	**123.58**
Total, 1916	2,266	5,737	**8,003**	4.85	2.27	**3.00**	172.55	133.69	**144.70**
Total, 1915	1,569	4,610	**6,179**	5.10	1.52	**2.43**	135.12	98.48	**107.78**
Total, 1914	1,934	5,324	**7,258**	4.14	3.57	**3.72**	125.13	90.53	**99.75**
Total, 1913	2,525	7,421	**9,946**	4.36	2.56	**3.02**	101.78	79.10	**84.86**
Total, 1912	3,275	8,789	**12,064**	1.83	1.59	**1.66**	51.60	71.91	**66.40**
Total, 1911	2,740	9,221	**11,961**	4.38	1.30	**2.01**	75.18	21.80	**34.03**

[a] Not segregated.

TABLE 16.—*FATALITIES:* *By kinds of mines, causes, and*

COPPER MINES.

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Alaska	......	......	......	......	......	1	......	......	......	......
Arizona	20	......	......	8	9	3	2	......	1	......
California	2	......	......	1	......	......	......	......	......	......
Idaho	......	......	......	......	......	......	......	......	......	......
Michigan	15	7	1	2	5	......	1	......	2	......
Montana	23	2	......	4	3	3	......	......	3	......
Nevada	2	......	......	1	7	2	......	......	......	......
New Mexico	......	......	......	2	......	......	......	......	......	......
Oregon	......	......	......	......	......	......	......	......	......	......
Utah	......	......	......	......	1	1	......	......	......	......
Washington	......	......	......	......	......	......	......	......	......	......
Other States	1	1	......	1	......	......	......	......	......	......
Total, 1918	**63**	**10**	**1**	**19**	**25**	**10**	**3**	......	**6**	......
Total, 1917	75	6	1	19	13	15	2	......	3	......
Total, 1916	66	3	......	18	7	14	3	......	7	......
Total, 1915	69	2	4	16	5	13	2	......	5	......
Total, 1914	57	2	1	14	10	22	4	1	5	......
Total, 1913	76	2	1	23	20	25	6	......	6	......
Total, 1912	87	......	4	21	9	16	6	1	9	......
Total, 1911	82	......	6	18	5	19	6	......	6	3

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

State.	1	2	3	4	5	6	7	8	9	10
Alaska	2	......	......	......	......	2	......	......	1	......
Arizona	......	......	......	......	......	2	......	......	......	......
California	12	......	......	3	3	6	......	......	3	......
Colorado	17	......	1	3	......	4	2	......	......	......
Georgia	......	......	......	......	......	......	......	......	......	......
Idaho	5	......	......	2	1	......	......	......	1	......
Montana	6	......	......	......	......	4	......	......	......	......
Nevada	5	......	......	6	......	2	1	1	......	......
New Mexico	......	......	......	1	......	1	......	......	......	......
New York [a]	......	......	......	......	......	......	......	......	......	......
North Carolina	......	......	......	......	......	......	......	......	......	......
Oregon	1	......	......	......	......	......	......	......	......	......
South Dakota	......	......	......	......	......	......	......	......	......	......
Tennessee	......	......	......	......	......	......	......	......	......	......
Utah	2	1	1	......	1	3	......	......	......	1
Virginia	......	......	......	......	......	......	......	......	......	......
Washington	......	......	......	......	......	......	......	......	......	......
Wyoming	......	......	......	......	......	......	......	......	......	......
Other States	1	......	......	1	......	1	......	......	......	......
Total, 1918	**51**	**1**	**2**	**16**	**5**	**25**	**3**	**1**	**5**	**1**
Total, 1917	42	2	1	28	4	26	3	......	6	1
Total, 1916	66	5	1	28	9	13	4	......	5	1
Total, 1915	49	4	2	37	7	23	5	1	4	......
Total, 1914	52	1	......	22	6	21	1	2	3	......
Total, 1913	68	1	3	35	2	21	2	......	5	4
Total, 1912	49	1	1	27	7	17	2	......	5	......
Total, 1911	40	......	2	24	7	18	6	......	7	5

[a] Not segregated.

States, during the year ended Dec. 31, 1918.

COPPER MINES.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
...	...	...	...	...	**1**	...	...	...	...	1	...	**1**
3	...	...	1	...	**47**	3	1	...	...	4	4	**12**
...	...	...	...	...	**3**	...	...	1	...	2	...	**3**
...	...	...	...	...	...	1	...	...	...	...	...	**1**
...	...	...	...	...	**33**	3	1	...	...	3	...	**7**
...	...	...	...	4	**42**	1	1	2	...	3	1	**8**
...	...	...	...	...	**12**	...	...	...	...	...	...	...
...	...	...	...	...	**2**	...	...	...	...	1	...	**1**
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	**2**	1	...	...	1	...	...	**2**
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	**3**	...	...	...	...	...	...	...
3	...	...	**1**	**4**	**145**	**9**	**3**	**3**	**1**	**14**	**5**	**35**
164	3	2	...	12	**315**	9	6	...	1	15	6	**37**
23	1	...	...	8	**150**	17	2	...	...	13	6	**38**
...	...	...	1	2	**119**	8	3	1	1	9	2	**24**
2	...	...	...	1	**119**	9	2	...	...	15	3	**28**
...	...	...	...	12	**171**	8	7	...	1	9	6	**32**
...	1	...	...	3	**157**	11	2	...	...	14	1	**28**
12	2	...	...	1	**160**	17	5	...	...	...	17	**39**

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

...	...	1	...	...	**6**	...	...	...	...	...	...	...
...	...	...	...	...	**2**	...	...	...	...	1	1	**2**
...	1	...	...	1	**29**	5	2	...	...	1	...	**8**
...	...	...	...	4	**31**	1	1	...	...	1	...	**3**
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	2	**11**	...	...	...	...	1	1	**2**
...	...	...	...	...	**10**	...	...	...	...	1	...	**1**
...	...	...	...	...	**15**	1	...	...	...	2	...	**3**
...	...	...	...	...	**2**	3	...	...	...	...	...	**3**
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	**1**	...	...	...	...	1	...	**1**
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	1	**10**	1	2	...	...	...	...	**3**
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
...	...	...	...	...	...	...	...	...	...	...	...	...
...	1	...	...	...	**4**	2	1	...	...	2	...	**5**
...	**2**	**1**	...	**8**	**121**	**13**	**6**	...	...	**10**	**2**	**31**
1	...	2	...	7	**123**	10	10	2	2	16	3	**43**
4	4	...	...	10	**150**	16	6	2	2	11	3	**40**
...	2	...	...	...	**134**	19	6	...	...	6	3	**34**
4	1	...	...	3	**116**	13	2	2	...	19	2	**38**
...	3	...	...	6	**150**	10	5	...	...	13	2	**30**
1	3	...	...	1	**114**	16	2	2	...	10	3	**33**
17	5	...	...	2	**133**	16	8	3	...	...	3	**30**

TABLE 16.—*FATALITIES: By kinds of mines, causes, and*

COPPER MINES.

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams. 22	Railway cars and locomotives. 23	Run or fall of ore in or from ore bins. 24	Falls of persons. 25	Stepping on nail. 26	Hand tools, axes, bars, etc. 27	Electricity. 28	Machinery. 29	Other causes. 30	Total, surface.
Alaska	......	......	......	......	......	......	......	......	......	......
Arizona	2	......	......	......	......	......	1	1	2	6
California	......	......	......	1	......	......	......	......	1	2
Idaho	......	......	......	......	......	......	......	......	......	......
Michigan	......	1	......	1	......	......	......	......	......	2
Montana	......	......	......	......	......	......	......	1	1	2
Nevada	......	......	......	......	......	......	......	......	......	......
New Mexico	......	......	......	......	......	......	......	1	......	1
Oregon	......	......	......	......	......	......	1	......	......	1
Utah	......	......	......	......	......	......	......	......	1	1
Washington	......	......	......	......	......	......	......	......	......	......
Other States	......	......	......	......	......	......	......	1	......	1
Total, 1918	**2**	**1**	......	**2**	......	......	**2**	**4**	**5**	**16**
Total, 1917	4	3	......	......	......	......	......	1	1	9
Total, 1916	3	3	......	4	......	......	1	5	5	21
Total, 1915	1	3	......	2	......	16	......	1	1	24
Total, 1914	2	2	......	1	......	......	......	......	3	8
Total, 1913	1	2	......	......	......	......	2	3	1	9
Total, 1912	1	5	......	4	......	......	3	3	15	31
Total, 1911	......	3	1	......	......	......	1	3	14	22

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams. 22	Railway cars and locomotives. 23	Run or fall of ore in or from ore bins. 24	Falls of persons. 25	Stepping on nail. 26	Hand tools, axes, bars, etc. 27	Electricity. 28	Machinery. 29	Other causes. 30	Total, surface.
Alaska	......	......	......	......	......	......	......	......	......	......
Arizona	......	......	......	......	......	......	......	1	......	1
California	......	......	......	......	......	......	......	......	2	2
Colorado	......	......	......	1	......	......	2	......	2	5
Georgia	......	......	......	......	......	......	......	......	......	......
Idaho	......	1	......	1	1	......	......	......	......	3
Montana	......	......	......	......	......	......	......	......	1	1
Nevada	......	......	......	......	......	......	1	......	2	3
New Mexico	......	......	......	......	......	......	......	......	......	......
New York[a]	......	......	......	......	......	......	......	......	......	......
North Carolina	......	......	......	......	......	......	......	......	......	......
Oregon	......	......	......	......	......	......	......	......	......	......
South Dakota	......	......	......	......	......	......	......	1	......	1
Tennessee	......	......	......	......	......	......	......	......	......	......
Utah	......	......	......	......	......	......	1	......	......	1
Virginia	......	......	......	......	......	......	......	......	......	......
Washington	......	......	......	......	......	......	......	......	......	......
Wyoming	......	......	......	......	......	......	......	......	......	......
Other States	......	......	......	......	......	......	......	......	......	......
Total, 1918	......	**1**	......	**2**	**1**	......	**4**	**2**	**7**	**17**
Total, 1917	......	......	......	8	......	......	4	2	12	26
Total, 1916	1	1	......	3	......	......	5	2	13	25
Total, 1915	2	1	......	......	......	......	1	5	2	11
Total, 1914	......	2	2	......	......	......	3	2	2	11
Total, 1913	2	1	......	2	1	......	1	5	6	18
Total, 1912	3	......	......	......	......	......	1	5	3	12
Total, 1911	3	......	1	......	......	......	1	3	17	25

[a] Not segregated.

States, during the year ended Dec. 31, 1918—Continued

COPPER MINES.

Open pit.												Grand total.							
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	**Total, open pit.**								
31	32	33	34	35	36	37	38	39	40	41		1918	1917	1916	1915	1914	1913	1912	1911
....	....	....	....	....	....	....	....	....	....	....	....	**2**	4	7	4	2	....	12	....
1	11	2	....	....	....	....	....	....	....	1	**15**	**80**	68	53	34	57	74	60	61
....	....	....	....	....	....	....	....	....	....	....	....	**8**	8	10	5	3	9	9	2
....	....	....	....	....	....	....	....	....	....	....	....	**1**	1	2	....	3	3	1	3
....	....	....	....	....	....	....	....	....	....	....	....	**42**	46	57	61	40	31	44	63
....	....	....	....	....	....	....	....	....	....	....	....	**52**	208	61	51	33	60	48	50
....	....	....	....	....	....	....	....	....	....	....	....	**12**	15	10	1	6	10	18	12
1	....	....	....	....	....	....	....	....	....	....	**1**	**5**	5	12	2	1	16	8	4
....	....	....	....	....	....	....	....	....	....	....	....	**1**	....	(a)	(a)	(a)	(a)	(a)	(a)
5	....	3	....	....	....	....	....	....	....	....	8	**13**	16	15	14	14	25	27	32
....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	1	....	2	1	2
....	....	....	....	....	....	....	....	....	....	....	....	**4**	2	3	3	6	3	11	9
7	11	5	....	....	....	....	....	....	....	1	24	**220**	....	....	....	....	....	....	....
4	1	8	....	....	....	....	....	....	....	....	13	....	374	....	....	....	....	....	....
5	6	7	....	....	....	....	....	1	....	2	21	....	....	230	....	....	....	....	....
2	....	6	....	1	....	....	....	....	....	....	9	....	....	....	176	....	....	....	....
1	6	3	....	....	....	....	....	....	....	....	10	....	....	....	....	165	....	....	....
4	6	12	....	....	....	....	2	....	....	....	24	....	....	....	....	....	236	....	....
3	13	4	2	....	....	....	....	....	....	1	23	....	....	....	....	....	....	239	....
7	5	2	....	1	....	....	2	....	....	....	17	....	....	....	....	....	....	....	238

GOLD, SILVER, AND MISCELLANEOUS METAL MINES.

31	32	33	34	35	36	37	38	39	40	41	Total, open pit	1918	1917	1916	1915	1914	1913	1912	1911
....	....	....	....	....	....	....	....	....	....	....	....	**6**	26	22	17	17	25	9	....
....	1	....	....	....	....	....	....	....	....	....	**1**	**6**	12	15	7	6	12	7	8
....	....	....	....	....	1	....	1	....	....	4	**6**	**45**	34	32	44	37	42	31	36
....	....	....	....	....	....	....	....	....	....	....	....	**39**	47	62	47	45	44	46	43
....	....	....	....	....	....	....	....	....	....	....	....	....	....	2	1	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	**16**	23	13	25	22	21	28	20
....	....	....	....	....	....	....	....	....	....	....	....	**12**	6	14	11	6	4	2	12
....	....	....	....	....	....	....	....	....	....	....	....	**21**	13	18	17	16	15	16	37
1	....	....	....	....	....	....	....	....	....	....	**1**	6	7	9	2	2	9	3	4
....	....	....	....	....	....	....	....	....	....	....	....	....	1	(a)	(a)	(a)	(a)	(a)	(a)
....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	3	2	1	2
....	....	....	....	....	....	....	1	....	....	....	**1**	3	1	1	2	1	3	1	2
....	....	....	....	....	....	....	....	....	....	....	....	**1**	7	6	6	4	8	6	8
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	3	3	3	2	....
....	....	....	....	....	....	1	....	....	....	....	**1**	**15**	9	9	9	15	9	12	17
1	....	....	....	....	....	....	....	....	....	....	**1**	**1**	3	1	....	1	7	2	....
....	....	....	....	....	....	....	....	....	....	....	....	....	2	3	3	....	2	3	1
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
....	....	1	....	....	....	....	....	....	....	....	**1**	**10**	4	10	5	1	4	7	3
2	1	1	....	....	1	1	2	....	....	4	12	**181**	....	....	....	....	....	....	....
....	1	1	....	1	....	....	....	....	....	1	4	....	196	....	....	....	....	....	....
....	....	1	....	....	....	....	1	....	....	....	2	....	....	217	....	....	....	....	....
6	5	1	....	3	....	....	2	2	....	1	20	....	....	....	199	....	....	....	....
3	3	1	....	2	1	....	1	2	....	1	14	....	....	....	....	179	....	....	....
1	2	1	....	....	1	....	3	2	....	2	12	....	....	....	....	....	210	....	....
5	1	4	2	1	....	....	1	1	....	2	17	....	....	....	....	....	....	176	....
3	....	....	....	1	....	....	....	....	....	1	5	....	....	....	....	....	....	....	193

TABLE 16.—*FATALITIES: By kinds of mines, causes, and*

IRON MINES.

State.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	2	3	4	5	6	7	8	9	10
Alabama	6	......	1	6	3	......	......	......	......	......
Georgia	......	......	......	......	......	......	......	......	......	......
Michigan	20	1	......	3	2	1	......	......	3	......
Minnesota	15	......	......	4	1	1	......	......	2	......
Missouri	......	......	......	......	......	......	......	......	......	......
New Jersey	2	......	......	......	......	......	......	......	......	......
New Mexico	1	......	......	......	......	......	......	3	......	......
New York	1	......	......	2	2	......	......	......	......	......
Pennsylvania	......	......	......	......	......	......	......	......	......	......
Tennessee	......	......	......	......	......	......	......	......	......	......
Virginia	......	......	......	......	......	1	......	......	......	......
Wisconsin	1	......	......	......	......	......	......	......	......	......
Other States	......	......	......	......	......	......	......	......	......	......
Total, 1918	**46**	**1**	**1**	**15**	**8**	**3**	......	**3**	**5**	......
Total, 1917	60	4	......	7	16	13	2	1	1	1
Total, 1916	53	1	1	15	16	12	3	......	3	......
Total, 1915	42	3	1	6	4	8	3	......	1	......
Total, 1914	51	3	1	8	13	5	......	......	......	......
Total, 1913	52	7	3	11	12	4	2	......	4	......
Total, 1912	55	1	1	15	17	9	1	1	2	2
Total, 1911	45	......	1	11	6	10	2	......	......	2

LEAD AND ZINC MINES.

State.	1	2	3	4	5	6	7	8	9	10
Arkansas	......	......	......	......	......	......	......	......	......	......
Illinois	......	......	......	......	......	......	......	......	......	......
Kansas	......	......	......	3	......	......	......	......	......	......
Missouri	3	......	......	......	1	......	......	......	......	......
Oklahoma	6	......	......	......	......	......	......	......	......	......
Tennessee	3	......	......	......	1	......	......	......	......	......
Wisconsin	1	......	......	......	1	......	......	......	......	......
Other States	......	1	......	1	......	......	......	......	......	......
Total, 1918	**13**	**1**	......	**4**	**3**	......	......	......	......	......
Total, 1917	23	3	......	15	3	2	......	......	1	......
Total, 1916	27	1	......	10	1	1	1	......	1	1
Total, 1915	27	1	......	11	1	1	......	......	......	......
Total, 1914	20	1	1	4	......	......	......	......	......	1
Total, 1913	16	......	1	7	1	1	......	......	1	......
Total, 1912	18	......	......	9	1	1	1	......	3	......
Total, 1911	18	......	1	3	2	......	......	......	2	......

NONMETALLIC MINERAL MINES.

State.	1	2	3	4	5	6	7	8	9	10
All States, 1918	**5**	......	......	**2**	**1**	......	......	......	......	......
All States, 1917	6	......	......	......	......	......	......	1	......	1
All States, 1916	5	......	......	3	......	......	......	......	1	......
All States, 1915	4	......	......	2	1	......	......	......	......	......
All States, 1914	5	......	......	1	2	......	......	......	......	......
All States, 1913	8	......	......	1	......	1	......	......	......	......
All States, 1912	3	......	......	1	1	......	......	......	......	......
All States, 1911	6	......	......	6	......	......	......	......	......	......

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States during the year ended Dec. 31, 1918.—Continued.

IRON MINES.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
				1	**17**					7		**7**
		17		2	**49**	2	2			3		**7**
				1	**24**	4						**4**
					2	1	3			1		**5**
					4							
					5				1			**1**
					1							
					1	1						**1**
		17		**4**	**103**	**8**	**5**		**1**	**11**		**25**
	1			1	**107**	15	2	1		9	1	**28**
	1	1	1	4	**111**	8	7			7		**22**
	1			1	**70**	2	1	1		3	1	**8**
2		8		2	**93**	10	4			7	6	**27**
				3	**98**	6	2	2	1	11	2	**24**
		5		2	**111**	7	4			13	1	**25**
8	1	12		5	**103**	23	3	1			6	**33**
LEAD AND ZINC MINES.												
		2			**2**	1						**1**
					3	2						**2**
				1	**5**	4				1	1	**6**
					6	1	2			4		**7**
					4						1	**1**
	1				**3**				1			**1**
					2							
	1	**2**		**1**	**25**	**8**	**2**		**1**	**5**	**2**	**18**
	2			2	**51**	7	3	1		1	2	**14**
			1		**44**	4	3			1		**8**
		3			**44**	5	2			2	1	**10**
2				1	**30**	3	2			2		**7**
				1	**28**	1	1		1	1		**4**
				2	**35**	5	4				4	**13**
				2	**28**	1	2				1	**4**
NONMETALLIC MINERAL MINES.												
					8	**1**	**1**					**2**
				1	**9**							
				1	**10**					1		**1**
					7		1					**1**
					8							
				1	**11**							
					5	1						**1**
					12							

TABLE 16.—***FATALITIES:*** *By kinds of mines, causes, and*

IRON MINES.

State.	Surface.									
	Mine cars, mine locomotives, or aerial trams. 22	Railway cars and locomotives. 23	Run or fall of ore in or from ore bins. 24	Falls of persons. 25	Stepping on nail. 26	Hand tools, axes, bars, etc. 27	Electricity. 28	Machinery. 29	Other causes. 30	**Total, surface.**
Alabama	1									1
Georgia										
Michigan	2	2					1	1	2	8
Minnesota		1								1
Missouri										
New Jersey										
New Mexico										
New York		1								1
Pennsylvania										
Tennessee										
Virginia										
Wisconsin										
Other States										
Total, 1918	3	4					1	1	2	11
Total, 1917	3	2		2				2	11	20
Total, 1916	5	1	1	6	1			2	4	20
Total, 1915	1	2	1						3	7
Total, 1914	1	1	2	3			1	1	2	11
Total, 1913	4		2	3			1	1	4	15
Total, 1912	2		2	2			1	1	1	9
Total, 1911	1	2	1					2	4	10
LEAD AND ZINC MINES.										
Arkansas										
Illinois										
Kansas				1						1
Missouri									1	1
Oklahoma										
Tennessee							1			1
Wisconsin									1	1
Other States										
Total, 1918				1			1		2	4
Total, 1917				1			1		1	3
Total, 1916				2			1	1	1	5
Total, 1915				1					3	4
Total, 1914								1	1	2
Total, 1913	2	1					1	2		6
Total, 1912								1	4	5
Total, 1911		3							7	10
NONMETALLIC MINES.										
All States, 1918	1	2	1			1		2		7
All States, 1917		2		2			1	1	1	7
All States, 1916			1			1		2	1	5
All States, 1915		1	1							2
All States, 1914		2	1				2			5
All States, 1913									1	1
All States, 1912								1	1	2
All States, 1911										

States during the year ended Dec. 31, 1918—Continued.

IRON MINES.

Open pit.												Grand total.							
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	**Total, open pit.**								
31	32	33	34	35	36	37	38	39	40	41		**1918**	1917	1916	1915	1914	1913	1912	1911
....	....	....	....	....	....	....	....	....	....	....	....	25	32	25	12	25	22	32	10
....	....	....	....	....	....	....	....	....	....	....	....	....	2	(a)	(a)	(a)	(a)	(a)	(a)
2	....	1	....	....	....	....	....	....	....	....	3	67	63	71	38	58	47	52	69
2	18	8	2	1	....	....	....	....	....	3	34	63	63	42	36	43	63	50	76
....	....	....	....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	1
....	....	....	....	....	....	....	....	....	....	....	....	7	5	5	4	3	5	7	20
....	....	....	....	....	....	....	....	....	....	....	....	4	1	(a)	(a)	(a)	(a)	(a)	(a)
....	....	....	....	....	....	....	....	....	....	....	....	7	8	13	7	7	12	14	6
1	....	....	....	....	....	....	....	....	....	....	1	1	....	3	....	....	....	2	1
....	2	....	....	....	....	....	....	....	....	....	2	2	2	1	1	4	1	1	2
....	....	....	....	....	....	....	....	....	....	....	....	1	4	1	1	1	3	2	5
....	....	....	....	....	....	....	....	....	....	....	....	2	6	4	2	2	9	9	2
....	....	....	....	....	....	....	....	....	....	....	....	....	4	3	2	5	3	3	5
5	**20**	**9**	**2**	**1**	....	....	....	....	....	3	40	**179**	....	....	....	....	....	....	....
11	8	13	2	1	....	....	1	....	....	....	36	....	191	....	....	....	....	....	....
2	6	5	1	....	1	....	....	....	....	1	16	....	....	169	....	....	....	....	....
2	1	11	1	1	1	....	....	....	....	1	18	....	....	....	103	....	....	....	....
7	2	5	1	1	....	....	1	....	....	....	17	....	....	....	....	148	....	....	....
8	3	11	2	1	....	....	2	1	....	....	28	....	....	....	....	....	165	....	....
5	5	11	....	1	2	....	2	....	....	1	27	....	....	....	....	....	....	172	....
22	10	14	1	....	1	....	....	....	....	3	51	....	....	....	....	....	....	....	197

LEAD AND ZINC MINES.

31	32	33	34	35	36	37	38	39	40	41	Total, open pit.	1918	1917	1916	1915	1914	1913	1912	1911
....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	3	3	44	3	....	1	1	1
....	....	....	....	....	....	....	....	....	....	....	....	6	3	1	2	1	4	2	2
....	....	....	....	....	....	....	....	....	....	....	....	12	35	31	44	25	34	36	37
....	....	....	....	....	....	....	....	....	....	....	....	13	18	4	4	3	1	1	....
....	....	....	....	....	....	....	....	....	....	....	....	6	4	4	(b)	(b)	(b)	(b)	(b)
....	....	....	....	....	....	....	....	....	....	....	....	5	5	13	6	9	2	13	1
....	....	....	....	....	....	....	....	....	....	....	....	2	....	....	....	2	....	1	2
....	....	....	....	....	....	....	....	....	....	....	....	47	....	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	....	68	....	....	....	....	....	....
....	....	....	....	....	....	....	....	....	....	....	....	....	....	57	....	....	....	....	....
....	....	1	....	....	....	....	....	....	....	1	2	....	....	....	60	....	....	....	....
....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	40	....	....	....
1	1	....	....	....	....	....	1	....	....	1	4	....	....	....	....	....	42	....	....
....	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....	....	....	54	....
....	....	....	....	....	....	....	....	....	....	1	1	....	....	....	....	....	....	....	43

NONMETALLIC MINES.

31	32	33	34	35	36	37	38	39	40	41	Total, open pit.	1918	1917	1916	1915	1914	1913	1912	1911
....	1	....	....	....	....	....	....	1	....	....	2	19	....	....	....	....	....	....	....
2	....	1	....	....	....	....	....	2	....	2	7	....	23	....	....	....	....	....	....
1	3	....	....	2	....	....	....	1	....	1	8	....	....	24	....	....	....	....	....
2	....	....	....	1	....	....	....	1	....	1	5	....	....	....	15	....	....	....	....
7	....	....	....	1	....	....	3	1	....	2	14	....	....	....	....	27	....	....	....
3	....	6	....	....	....	....	2	2	....	5	18	....	....	....	....	....	30	....	....
3	2	1	....	1	....	....	2	....	....	3	12	....	....	....	....	....	....	20	....
3	1	5	....	1	....	....	....	1	....	1	12	....	....	....	....	....	....	....	24

[a] Not segregated.

[b] Included in gold, silver, and miscellaneous metal.

TABLE 17.—***ALL MINES:*** *Fatalities and injuries, by causes*

NUMBER KILLED.

Kind of mine.	Underground.									
	Fall of rock or ore from roof or wall. 1	Rock or ore while loading at working face. 2	Timber or hand tools. 3	Explosives. 4	Haulage accidents. 5	Falling down chute, winze, raise, or stope. 6	Run of ore from chute or pocket. 7	Drilling accidents. 8	Electricity. 9	Machinery not including locomotives or drills). 10
Copper	63	10	1	19	25	10	3	......	6	......
Gold, silver, and miscellaneous metal	51	1	2	16	5	25	3	1	5	1
Iron	46	1	1	15	8	3	......	3	5	......
Lead and zinc (Mississippi Valley)	13	1	......	4	3	......	......	......	......	......
Nonmetallic mineral	5	......	......	2	1	......	......	......	......	......
Total, 1918	**178**	**13**	**4**	**56**	**42**	**38**	**6**	**4**	**16**	**1**
Percentage of grand total killed	27.56	2.01	.62	8.67	6.50	5.88	.93	.62	2.46	.15
Percentage of class total killed	44.28	3.23	.99	13.93	10.45	9.45	1.49	.99	3.98	.25
Number killed per 1,000 300-day workers employed underground	1.57	.11	.04	.49	.37	.33	.05	.04	.14	.01
NUMBER INJURED.										
Copper	4,852	2,304	1,722	196	2,250	537	452	874	34	83
Gold, silver, and miscellaneous metal	1,035	730	453	76	656	249	58	379	27	69
Iron	1,579	929	880	228	1,015	170	103	285	33	92
Lead and zinc (Mississippi Valley)	480	805	86	47	449	49	7	315	21	39
Nonmetallic mineral	27	54	12	8	63	5	1	28	3	12
Total, 1918	**7,973**	**4,822**	**3,153**	**555**	**4,433**	**1,010**	**621**	**1,881**	**118**	**295**
Percentage of grand total injured	18.58	11.24	7.35	1.29	10.33	2.35	1.45	4.38	.27	.69
Percentage of class total injured	25.03	15.14	9.90	1.74	13.92	3.17	1.95	5.91	.37	.93
Number injured per 1,000 300-day workers employed underground	70.28	42.51	27.80	4.89	39.08	8.90	5.47	16.58	1.04	2.60
1911–1917.										
Fatalities, 1911 to 1917:										
Number (total United States)	1,422	54	38	476	208	331	67	8	96	22
Percentage of grand total	30.26	1.15	.81	10.13	4.43	7.04	1.42	.17	2.04	.47
Injuries, 1911 to 1917:										
Number (total United States)	51,248	25,031	22,467	3,141	27,761	6,600	6,079	12,555	426	3,043
Percentage of grand total	20.47	10.00	8.97	1.25	11.09	2.64	2.43	5.02	.17	1.22

[a] Less than one-tenth of 1 per cent.

and kinds of mines, during the year ended Dec. 31, 1918.

NUMBER KILLED.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush or water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
3	......	......	1	4	**145**	9	3	3	1	14	**5**	**35**
......	2	1	......	8	**121**	13	6	......	......	10	**2**	**31**
......	......	17	......	4	**103**	8	5	......	1	11	......	**25**
......	1	2	......	1	**25**	8	2	......	1	5	**2**	**18**
......	......	......	......	......	**8**	1	1	......	......	......	......	**2**
3	**3**	**20**	**1**	**17**	**402**	**39**	**17**	**3**	**3**	**40**	**9**	**111**
.47	.47	3.10	.15	2.63	**62.23**	6.03	2.63	.47	.47	6.19	**1.39**	**17.18**
.75	.75	4.98	.25	4.23	**100.00**	35.14	15.31	2.70	2.70	36.04	**8.11**	**100.00**
.03	.03	.18	.01	.15	**3.55**	.34	.15	.03	.03	.35	**.08**	**.98**

NUMBER INJURED.

4	36	3	405	3,055	**16,807**	21	132	9	1	122	**109**	**394**
......	6	136	105	1,248	**5,227**	19	43	6	1	64	**69**	**202**
......	1	1	156	1,120	**6,592**	9	57	2	......	106	**92**	**266**
......	13	3	96	492	**2,902**	20	73	1	......	94	**55**	**243**
......	......	......	6	106	**325**	2	2	......	......	2	**3**	**9**
4	**56**	**143**	**768**	**6,021**	**31,853**	**71**	**307**	**18**	**2**	**388**	**328**	**1,114**
.01	.13	.33	1.79	14.03	**74.22**	.17	.72	.04	(*a*)	.90	**.77**	**2.60**
.01	.17	.45	2.41	18.90	**100.00**	6.37	27.56	1.62	.17	34.83	**29.45**	**100.00**
.04	.49	1.26	6.77	53.08	**280.79**	.62	2.70	.16	.02	3.42	**2.89**	**9.81**

1911–1917.

240	31	33	3	97	**3,126**	277	107	18	9	208	**85**	704
5.11	.66	.70	.06	2.06	**66.51**	5.89	2.28	.38	.19	4.43	**1.81**	14.98
162	280	95	3,043	31,472	**193,403**	625	2,033	58	59	1,717	**1,798**	6,290
.06	.11	.04	1.22	12.57	**77.26**	.25	.81	.02	.02	.69	**.72**	2.51

TABLE 17.—*ALL MINES: Fatalities and injuries, by causes*

NUMBER KILLED.

Kind of mine.	Surface (shops and power plants).									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	**Total surface.**
	22	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	
Copper	2	1	......	2	......	......	2	4	5	**16**
Gold, silver, and miscellaneous metal	......	1	......	2	1	......	4	2	7	**17**
Iron	3	4	......	......	......	......	1	1	2	**11**
Lead and zinc (Mississippi valley)	......	......	......	1	......	......	1	......	2	**4**
Nonmetallic mineral	1	2	1	......	......	1	......	2	......	**7**
Total	**6**	**8**	**1**	**5**	**1**	**1**	**8**	**9**	**16**	**55**
Percentage of grand total killed	.93	1.24	.15	.78	.15	.15	1.24	1.39	2.47	**8.51**
Percentage of class total killed	10.91	14.54	1.82	9.09	1.82	1.82	14.54	16.37	29.09	**100.00**
Number killed per 1,000 300-day workers employed on the surface	.09	.12	.01	.07	.01	.01	.12	.13	.24	**.81**

NUMBER INJURED.

Kind of mine.	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	**Total surface.**
Copper	107	47	41	207	93	316	26	188	976	**2,001**
Gold, silver, and miscellaneous metal	102	23	12	251	189	197	19	239	1,109	**2,141**
Iron	97	44	17	142	61	187	6	123	593	**1,270**
Lead and zinc (Mississippi Valley)	35	17	15	37	47	51	5	72	313	**592**
Nonmetallic mineral	47	33	5	35	61	77	13	76	337	**684**
Total	**388**	**164**	**90**	**672**	**451**	**828**	**69**	**698**	**3,328**	**6,688**
Percentage of grand total injured	.90	.38	.21	1.57	1.05	1.93	.16	1.63	7.75	**15.58**
Percentage of class total injured	5.80	2.45	1.35	10.05	6.74	12.38	1.03	10.44	49.76	**100.00**
Number injured per 1,000 300-day workers employed on the surface	5.74	2.43	1.33	9.95	6.68	12.25	1.02	10.33	49.26	**98.99**

1911-1917.

Kind of mine.	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	**Total surface.**
Fatalities, 1911 to 1917:										
Number	42	43	16	46	2	1	32	58	161	**401**
Percentage of grand total	.89	.91	.34	.98	.04	.02	.68	1.24	3.43	**8.53**
Injuries, 1911 to 1917:										
Number	1,883	844	735	2,819	1,529	3,986	262	3,178	11,635	**26,871**
Percentage of grand total	.75	.34	.29	1.13	.61	1.59	.11	1.27	4.65	**10.74**

and kinds of mines, during the year ended Dec. 31, 1918—Continued.

NUMBER KILLED.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.	Grand total.
31	32	33	34	35	36	37	38	39	40	41		1918
7	11	5	......	......	......	......	......	......	......	1	84	220
2	1	1	......	......	1	1	2	......	......	4	12	181
5	20	9	2	1	......	......	......	......	......	3	40	179
......	......	......	......	......	......	......	......	......	......	......	......	47
......	1	......	......	......	......	......	......	1	......	......	2	19
14	**33**	**15**	**2**	**1**	**1**	**1**	**2**	**1**	......	**8**	**78**	**646**
2.17	5.11	2.33	.31	.15	.15	.15	.31	.15	......	1.24	**12.08**	**100.00**
17.95	42.31	19.23	2.56	1.28	1.28	1.28	2.56	1.28	......	10.26	**100.00**	......
.21	.49	.22	.03	.01	.01	.01	.03	.01	......	.12	**1.15**	**3.57**
NUMBER INJURED.												
275	37	126	77	115	3	3	55	......	126	494	**1,311**	**20,513**
31	8	22	2	41	22	7	19	3	30	92	**277**	**7,847**
177	32	264	153	110	9	5	40	1	144	558	**1,493**	**9,621**
1	......	......	8	......	......	......	......	......	......	......	**9**	**3,746**
17	25	8	5	12	......	2	12	2	6	81	**170**	**1,188**
501	**102**	**420**	**245**	**278**	**34**	**17**	**126**	**6**	**306**	**1,225**	**3,260**	**42,915**
1.17	.24	.98	.57	.65	.08	.04	.29	.01	.71	2.86	**7.60**	**100.00**
15.37	3.13	12.88	7.52	8.53	1.04	.52	3.86	.18	9.39	37.58	**100.00**	......
7.41	1.51	6.22	3.63	4.11	.50	.25	1.86	.09	4.53	18.14	**48.25**	**237.09**
1911-1917.												
123	91	135	12	21	**7**	......	28	16	......	36	**469**	**4,700**
2.62	1.94	2.87	.25	.45	**.15**	......	.59	.34	......	.77	**9,98**	**100.00**
4,116	881	2,735	**1,647**	2,208	**209**	117	1,399	73	2,275	8,092	**23,752**	**250,316**
1.65	.35	1.09	.66	.88	.08	.05	.56	.03	.91	3.23	**9.49**	**100.00**

TABLE 18.—***INJURIES:*** *By kinds of mines and*

	Underground.									
	Fall of rock or ore from roof or wall. 1	Rock or ore while loading at working face. 2	Timber or hand tools. 3	Explosives. 4	Haulage accidents. 5	Falling down chute, winze, raise, or stope. 6	Run of ore from chute or pocket. 7	Drilling accidents. 8	Electricity. 9	Machinery (not including locomotives or drills). 10
Copper.										
1918	**4,852**	**2,304**	**1,722**	**196**	**2,250**	**537**	**452**	**874**	**34**	**83**
1917	4,500	2,351	1,760	223	2,142	446	246	802	25	134
1916	4,758	2,484	2,078	280	2,070	495	658	723	25	133
1915	3,329	1,902	1,289	124	1,493	374	300	962	26	307
1914	3,015	1,903	1,103	125	1,343	434	318	580	21	60
1913	3,216	1,014	1,589	124	1,499	555	479	511	12	135
1912	3,740	1,611	1,185	105	1,142	556	541	626	19	193
1911	3,273	......	788	96	1,853	549	489	564	14	324
Gold and miscellaneous metal.										
1918	**1,035**	**730**	**453**	**76**	**656**	**249**	**58**	**379**	**27**	**69**
1917	1,123	679	548	108	615	308	141	502	25	192
1916	2,017	1,089	729	146	929	346	138	695	28	57
1915	1,512	948	846	83	761	309	195	613	21	51
1914	1,225	472	528	72	609	223	146	416	4	64
1913	806	261	360	61	406	183	287	298	8	68
1912	893	244	394	64	409	158	246	251	5	56
1911	978	......	269	90	326	119	275	258	4	71
Iron.										
1918	**1,579**	**929**	**880**	**228**	**1,015**	**170**	**103**	**285**	**33**	**92**
1917	1,846	1,413	1,202	107	1,586	209	165	455	26	64
1916	2,053	1,304	1,260	322	1,645	155	178	509	33	68
1915	1,430	920	981	76	1,135	123	161	406	16	48
1914	1,532	877	1,002	85	1,110	142	179	373	20	53
1913	2,448	968	1,754	154	1,730	202	349	557	37	227
1912	2,036	791	1,206	193	1,485	188	238	591	12	102
1911	2,556	......	964	147	1,154	192	203	443	11	227
Lead and zinc (Mississippi Valley).										
1918	**480**	**805**	**86**	**47**	**449**	**49**	**7**	**315**	**21**	**39**
1917	528	776	90	54	433	103	37	363	6	17
1916	651	960	117	50	527	63	44	302	3	67
1915	323	640	83	44	308	37	25	169	6	41
1914	303	239	72	44	193	20	6	90	3	22
1913	206	285	77	22	134	6	3	112	......	48
1912	299	453	60	26	228	37	16	124	2	109
1911	386	......	36	34	157	45	12	121	4	49
Nonmetallic mineral.										
1918	**27**	**54**	**12**	**8**	**63**	**5**	**1**	**28**	**3**	**12**
1917	35	114	18	7	49	8	1	25	3	11
1916	56	114	11	12	55	1	......	24	......	7
1915	29	66	11	15	35	4	1	7	......	2
1914	29	62	25	8	48	4	......	29	4	5
1913	38	56	15	15	65	1	......	22	2	9
1912	16	35	11	11	47	2	......	21	1	11
1911	63	......	6	14	40	3	2	11	......	11
Total, U. S.										
1918	**7,973**	**4,822**	**3,153**	**555**	**4,433**	**1,010**	**621**	**1,881**	**118**	**295**
1917	8,032	5,333	3,618	499	4,825	1,074	590	2,147	85	418
1916	9,535	5,951	4,195	810	5,226	1,060	1,018	2,253	89	332
1915	6,623	4,476	3,210	342	3,732	847	682	2,157	69	449
1914	6,104	3,553	2,730	334	3,303	823	649	1,488	52	204
1913	6,714	2,584	3,795	376	3,834	947	1,118	1,500	59	487
1912	6,984	3,134	2,856	399	3,311	941	1,041	1,613	39	471
1911	7,256	......	2,063	381	3,530	908	981	1,397	33	682
Total, 8 years	**59,221**	**29,853**	**25,620**	**3,696**	**32,194**	**7,610**	**6,700**	**14,436**	**544**	**3,338**

causes, during the years ended Dec. 31, 1911 to 1918.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts.	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	12	13	14	15		16	17	18	19	20	21	
4	36	3	405	3,055	16,807	21	132	9	1	122	109	394
39	31	3	296	3,172	16,170	18	121	3	1	90	129	362
2	13	....	237	2,391	16,347	41	89	....	1	57	108	296
12	18	....	227	1,880	12,243	26	97	1	....	61	98	283
1	3	....	108	1,779	10,793	16	71	....	....	90	69	246
9	5	3	120	1,394	10,665	35	99	2	3	74	60	273
6	3	1	130	1,630	11,488	63	110	....	....	79	38	290
7	8	....	....	682	8,647	23	56	5	3	....	62	149
....	6	136	105	1,248	5,227	19	43	6	1	64	69	202
3	14	1	191	2,351	6,801	29	65	8	3	107	131	343
5	16	1	213	1,542	7,951	56	91	4	3	108	112	374
14	36	13	212	1,177	6,791	21	45	2	1	84	46	199
5	11	....	36	704	4,515	15	39	9	1	43	34	141
1	10	1	36	412	3,198	18	35	2	2	42	28	127
6	14	1	26	413	3,180	15	46	3	2	38	27	131
7	4	9	....	699	3,109	18	34	....	13	....	58	123
....	1	1	156	1,120	6,592	9	57	2	....	106	92	266
3	9	....	198	1,313	8,596	22	49	4	2	96	103	276
....	6	3	178	1,231	8,945	24	62	....	2	112	101	301
1	11	....	131	964	6,403	11	70	1	....	80	66	228
....	8	12	80	901	6,374	12	48	....	2	86	63	211
1	6	13	142	1,015	9,603	38	85	5	3	87	43	261
....	18	8	71	651	7,590	18	91	2	1	96	56	264
6	4	1	....	1,721	7,629	40	77	....	8	....	90	215
....	13	3	96	492	2,902	20	73	1	....	94	55	243
....	10	....	118	858	3,393	16	214	2	2	81	69	384
14	3	....	115	668	3,584	9	101	1	1	81	67	260
15	13	21	113	410	2,248	3	56	1	1	33	28	122
....	....	....	8	375	1,375	7	24	....	....	39	30	100
1	....	....	17	167	1,078	6	26	....	....	14	17	63
....	....	....	14	285	1,653	8	30	1	2	32	22	95
4	2	3	....	310	1,163	11	88	2	2	....	34	137
....	....	....	6	106	325	2	2	....	....	2	3	9
....	....	....	11	144	426	....	1	....	....	....	3	4
....	....	....	7	90	377	2	4	....	....	2	6	14
....	4	....	3	31	208	....	3	....	....	1	....	4
....	....	....	2	24	240	....	....	....	....	2	....	2
....	....	....	3	22	248	3	4	....	....	2	....	9
....	....	....	....	13	168	....	1	....	....	....	....	1
....	....	1	....	53	204	1	1	....	....	....	....	2
4	56	143	768	6,021	31,853	71	307	18	2	388	328	1,114
45	64	4	814	7,838	35,386	85	450	17	8	374	435	1,369
21	38	4	750	5,922	37,204	132	347	5	7	360	394	1,245
42	82	34	686	4,462	27,893	61	271	5	2	259	238	836
6	22	12	234	3,783	23,297	50	182	9	3	260	196	700
12	21	17	318	3,010	24,792	100	249	9	8	219	148	733
12	35	10	241	2,992	24,079	104	278	6	5	245	143	781
24	18	14	....	3,465	20,752	93	256	7	26	....	244	626
166	**336**	**238**	**3,811**	**37,493**	**225,256**	**696**	**2,340**	**76**	**61**	**2,105**	**2,126**	**7,404**

TABLE 18.—*INJURIES: By kinds of mines and*

	Surface.									
	Mine cars, mine locomotives, or aerial trams.	Railway cars and locomotives.	Run or fall of ore in or from ore bins.	Falls of persons.	Stepping on nail.	Hand tools, axes, bars, etc.	Electricity.	Machinery.	Other causes.	Total, surface.
	22	23	24	25	26	27	28	29	30	
Copper.										
1918	107	47	41	207	93	316	26	188	976	2,001
1917	145	62	45	207	79	303	8	139	1,061	2,049
1916	137	40	44	211	80	218	22	161	1,131	2,044
1915	62	29	34	134	67	190	5	134	789	1,444
1914	105	22	40	100	42	188	10	107	372	986
1913	74	27	30	87	25	181	8	123	349	904
1912	63	29	37	129	20	159	6	204	261	908
1911	33	16	62	......	......	......	15	77	536	739
Gold and miscellaneous metal.										
1918	102	23	12	251	189	197	19	239	1,109	2,141
1917	75	21	19	105	96	131	19	123	437	1,026
1916	134	28	19	131	88	179	15	145	552	1,291
1915	81	15	21	114	67	132	33	116	342	921
1914	45	28	14	49	19	93	6	71	205	530
1913	34	3	8	33	11	52	4	78	84	307
1912	28	6	5	32	28	51	14	55	97	316
1911	43	5	10	......	......	......	6	58	155	277
Iron.										
1918	97	44	17	142	61	187	6	123	593	1,270
1917	136	70	28	190	114	254	17	143	745	1,697
1916	131	69	20	176	87	216	10	151	661	1,521
1915	54	27	17	113	51	175	5	93	413	948
1914	84	30	22	196	55	185	7	114	437	1,130
1913	46	44	12	221	65	408	10	164	457	1,427
1912	56	41	59	208	47	315	9	172	274	1,181
1911	91	29	35	......	......	......	1	188	441	785
Lead and zinc (Mississippi Valley).										
1918	35	17	15	37	47	51	5	72	313	592
1917	31	26	24	54	84	83	7	131	291	731
1916	34	25	30	102	96	93	6	98	376	860
1915	14	9	24	24	42	35	5	27	105	285
1914	14	7	11	16	15	39	2	24	146	274
1913	2	55	2	28	25	32	......	45	81	270
1912	21	1	19	22	19	36	......	37	74	229
1911	13	6	9	......	......	......	1	53	85	167
Nonmetallic mineral.										
1918	47	33	5	35	61	77	13	76	337	684
1917	24	44	7	37	47	48	4	41	250	502
1916	40	14	12	38	97	117	5	47	174	544
1915	7	7	6	27	39	44	1	24	120	275
1914	9	6	8	26	14	21	1	17	94	196
1913	10	......	2	7	1	7	......	8	7	42
1912	2	2	......	2	9	1	......	5	20	41
1911	5	1	......	......	......	......	......	5	13	24
Total, U. S.										
1918	388	164	90	672	451	828	69	698	3,328	6,688
1917	411	223	123	593	420	819	55	577	2,784	6,005
1916	476	176	125	658	448	823	58	602	2,894	6,260
1915	218	87	102	412	266	576	49	394	1,769	3,873
1914	257	93	95	387	145	526	26	333	1,254	3,116
1913	166	129	54	376	127	680	22	418	978	2,950
1912	170	79	120	393	123	562	29	473	726	2,675
1911	185	57	116	......	......	......	23	381	1,230	1,992
Total, 8 years	2,271	1,008	825	3,491	1,980	4,814	331	3,876	14,963	33,559

causes during the years ended Dec. 31, 1911 to 1918—Continued.

Open pit.												
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	**Total, open pit.**	**Grand total.**
31	32	33	34	35	36	37	38	39	40	41		
275	37	126	77	115	3	3	55	......	126	494	1,311	20,513
304	24	117	67	147	8	4	37	1	84	561	1,354	19,935
316	8	111	36	46	2	1	27	3	79	852	1,481	20,168
343	23	113	52	124	3	2	35	2	76	511	1,284	15,254
303	84	162	52	146	1	1	60	4	92	437	1,342	13,367
361	93	134	67	181	1	3	49	3	112	517	1,521	13,363
244	66	104	104	99	30	......	41	5	27	231	951	13,637
225	52	89	45	112	37	......	171	4	......	72	807	10,342
31	8	22	2	41	22	7	19	3	30	92	277	7,847
43	11	23	......	10	......	1	11	1	22	93	215	8,385
36	4	11	......	84	......	......	137	2	110	234	618	10,234
45	7	2	......	55	3	1	91	5	69	188	466	8,377
45	5	7	......	32	......	5	97	3	120	101	415	5,601
31	6	10	35	27	3	1	9	3	38	60	223	3,855
36	2	3	17	23	3	1	8	1	46	26	166	3,793
16	7	10	6	24	6	2	10	3	......	25	109	3,618
177	32	264	153	110	9	5	40	1	144	558	1,493	9,621
206	65	269	233	143	3	16	51	1	211	511	1,709	12,278
145	40	200	144	93	3	10	26	4	123	349	1,137	11,904
126	13	94	42	67	3	6	8	......	113	286	758	8,337
143	35	126	100	101	9	......	19	......	140	385	1,058	8,773
361	90	264	244	151	30	22	70	2	350	598	2,182	13,473
249	88	211	177	147	7	5	60	......	242	286	1,472	10,507
258	80	351	193	206	34	10	108	4	......	849	2,093	10,722
1	......	......	8	......	......	......	......	......	......	......	9	3,746
3	......	17	......	......	......	1	......	......	3	12	36	4,544
13	1	25	2	3	......	3	1	......	5	16	69	4,773
4	......	2	......	......	......	......	......	......	......	......	6	2,661
1	......	......	......	1	......	......	......	......	......	......	2	1,751
8	2	1	1	1	......	1	1	......	2	8	25	1,436
2	......	......	3	1	5	2	......	4	......	2	19	1,996
2	1	2	......	2	2	1	4	......	......	7	21	1,488
17	25	8	5	12	......	2	12	2	6	81	170	1,188
23	18	17	9	11	......	2	9	1	19	103	212	1,144
31	7	30	4	21	......	6	17	3	30	74	223	1,158
18	3	18	1	9	1	6	33	3	18	69	179	666
49	6	34	1	18	4	2	32	1	38	101	286	724
81	12	70	5	59	8	1	60	6	46	197	545	844
26	18	60	7	61	3	1	63	3	60	289	591	801
19	10	48	......	3	......	......	59	1	......	37	177	407
501	102	420	245	278	34	17	126	6	306	1,225	3,260	42,915
579	118	443	309	311	11	24	108	4	339	1,280	3,526	46,286
541	60	377	186	247	5	20	208	12	347	1,525	3,528	48,237
536	46	229	95	255	10	15	167	10	276	1,054	2,693	35,295
541	130	329	153	298	14	8	208	8	390	1,024	3,103	30,216
842	203	479	352	419	42	28	189	14	548	1,380	4,496	32,971
557	174	378	308	331	48	9	172	13	375	834	3,199	30,734
520	150	500	244	347	79	13	347	12	......	995	3,207	26,577
4,617	983	3,155	1,892	2,486	243	134	1,525	79	2,581	9,317	27,012	293,231

TABLE 19.—*ALL MINES: Percentages of fatalities and injuries, by causes and kinds of mines, during the year ended Dec. 31, 1918.*

Causes.	Percentage killed.							Percentage injured.						
	Copper.	Gold, silver, and miscellaneous metal.	Iron.	Lead and zinc (Mississippi Valley).	Non-metallic mineral.	Total.		Copper.	Gold, silver, and miscellaneous metal.	Iron.	Lead and zinc (Mississippi Valley).	Non-metallic mineral.	Total.	
						1918	1917						1918	1917
Underground:														
1. Fall of rock or ore from roof or wall	28.64	28.18	25.70	27.66	26.31	**27.56**	**24.18**	23.65	13.19	16.41	12.81	2.27	**18.58**	**17.35**
2. Rock or ore while loading at working face or chute	4.55	.55	.56	2.13		**2.01**	**1.76**	11.23	9.30	9.66	21.49	4.55	**11.24**	**11.52**
3. Timber or hand tools	.45	1.10	.56			**.62**	**.23**	8.39	5.77	9.15	2.30	1.01	**7.35**	**7.82**
4. Explosives	8.64	8.84	8.38	8.51	10.53	**8.67**	**8.10**	.96	.97	2.37	1.25	.67	**1.29**	**1.08**
5. Haulage system (mine cars, mine locomotives, breakage of rope, etc.)	11.36	2.77	4.47	6.38	5.26	**6.50**	**4.23**	10.97	8.36	10.55	11.99	5.30	**10.33**	**10.42**
6. Falling down chute, winze, raise, or stope	4.55	13.82	1.67			**5.88**	**6.57**	2.62	3.17	1.77	1.31	.42	**2.35**	**2.32**
7. Run of ore from chute or pocket	1.36	1.66				**.93**	**.82**	2.20	.74	1.07	.19	.08	**1.45**	**1.28**
8. Drilling accidents (by machine or hand drills)		.55	1.67			**.62**	**.23**	4.26	4.83	2.96	8.41	2.36	**4.38**	**4.64**
9. Electricity	2.73	2.76	2.79			**2.46**	**1.29**	.17	.34	.34	.56	.25	**.27**	**.18**
10. Machinery (other than locomotives or drills)		.55				**.15**	**.35**	.40	.88	.96	1.04	1.01	**.69**	**.90**
11. Mine fires	1.36					**.47**	**19.37**	.02					**.01**	**.10**
12. Suffocation from natural gases		1.10		2.13		**.47**	**.70**	.18	.08	.01	.35		**.13**	**.14**
13. Inrush of water		.55	9.50	4.25		**3.10**	**.47**	.01	1.73	.01	.08		**.33**	**.01**
14. Nails, splinters, etc	.45					**.15**		1.98	1.34	1.62	2.56	.51	**1.79**	**1.76**
15. Other causes	1.82	4.42	2.23	2.13		**2.63**	**2.70**	14.89	15.91	11.64	13.13	8.92	**14.03**	**16.93**
Total underground	**65.91**	**66.85**	**57.54**	**53.19**	**42.10**	**62.23**	**71.01**	**81.93**	**66.61**	**68.52**	**77.47**	**27.35**	**74.22**	**76.45**
Shaft:														
16. Falling down shafts	4.09	7.18	4.47	17.02	5.26	**6.03**	**4.81**	.10	.24	.09	.53	.17	**.17**	**.18**
17. Objects falling down shafts	1.36	3.32	2.79	4.25	5.26	**2.63**	**2.47**	.64	.55	.59	1.95	.17	**.72**	**.97**
18. Breaking of cables	1.36					**.47**	**.47**	.04	.08	.02	.03		**.04**	**.04**
19. Overwinding	.45		.56	2.13		**.47**	**.35**	.01	.01				(*a*)	**.02**
20. Skip, cage, or bucket	6.37	5.53	6.15	10.64		**6.19**	**4.81**	.60	.82	1.10	2.51	.17	**.90**	**.81**
21. Other causes	2.27	1.10		4.25		**1.39**	**1.41**	.53	.88	.96	1.47	.25	**.77**	**.94**
Total shaft	**15.91**	**17.13**	**13.97**	**38.30**	**10.53**	**17.18**	**14.32**	**1.92**	**2.58**	**2.76**	**6.49**	**.76**	**2.60**	**2.96**

Surface (at surface yards and shops):														
22. Mine cars or mine locomotives, gravity or aerial trams.	.91		1.67		5.26	.93	.82	.52	1.30	1.01	.93	3.96	.90	.89
23. Railway cars and locomotives	.45	.55	2.23		10.53	1.24	.82	.23	.29	.46	.45	2.78	.38	.48
24. Run or fall of ore in or from ore bins					5.26	.15		.20	.15	.18	.40	.42	.21	.26
25. Falls of persons	.91	1.10		2.13		.78	1.53	1.01	3.20	1.48	.99	2.95	1.57	1.28
26. Nails, splinters, etc		.55				.15		.45	2.41	.63	1.26	5.13	1.05	.91
27. Hand tools, axes, bars, etc					5.26	.15		1.54	2.51	1.94	1.36	6.48	1.93	1.77
28. Electricity	.91	2.21	.56	2.13		1.24	.70	.13	.24	.06	.13	1.09	.16	.12
29. Machinery	1.82	1.10	.56		10.53	1.39	.70	.92	3.05	1.28	1.92	6.40	1.63	1.25
30. Other causes	2.27	3.87	1.12	4.25		2.47	3.05	4.76	14.13	6.16	8.36	28.37	7.75	6.01
Total surface	7.27	9.39	6.14	8.51	36.84	8.51	7.63	9.76	27.28	13.20	15.80	57.58	15.58	12.97
Open pit:														
31. Falls or slides of rock or ore	3.18	1.10	2.79			2.17	2.00	1.34	.40	1.84	.03	1.43	1.17	1.25
32. Explosives	5.00	.55	11.18		5.26	5.11	1.18	.18	.10	.33		2.10	.24	.26
33. Haulage system (cars, locomotives, etc.)	2.27	.55	5.03			2.33	2.70	.62	.28	2.75		.67	.98	.96
34. Steam shovels			1.12			.31	.23	.37	.03	1.59	.21	.42	.57	.67
35. Falls of persons			.56			.15	.23	.56	.52	1.14		1.01	.65	.67
36. Falls of derricks, booms, etc		.55				.15		.01	.28	.09			.08	.02
37. Run or fall of ore in or from ore bins		.55				.15		.01	.09	.05		.17	.04	.05
38. Machinery (other than locomotives or steam shovels).		1.10				.31	.12	.27	.24	.42		1.01	.29	.23
39. Electricity					5.26	.15	.23		.04	.01		.17	.01	.01
40. Hand tools								.62	.38	1.50		.51	.71	.73
41. Other causes	.45	2.21	1.67			1.24	.35	2.41	1.17	5.80		6.82	2.86	2.77
Total open pit	10.91	6.63	22.35		10.53	12.08	7.04	6.39	3.53	15.52	.24	14.31	7.60	7.62
Grand total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

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[a] Less than one-tenth of 1 per cent.

ACCIDENT STATISTICS, BY STATES.

A compilation of the accident statistics, by States, is given in Tables 3, 4, and 5. These statistics represent 3,636 operators who employed 182,606 men in 1918. Tables 29 to 36, inclusive, give summary data, by States and years, relating to labor, accidents, etc., for the eight-year period 1911 to 1918, inclusive.

CAUSES AND DISTRIBUTION OF ACCIDENTS.

Tables 16, 17, and 18 show the number of deaths and injuries from any one cause in each group of mines, and for all the mines combined. Table 19 shows the percentage of fatalities and injuries due to any one cause for the year 1917, while at the bottom of Table 17 is given a similar percentage for the eight-year period 1911 to 1918 for the United States as a unit.

FATALITY AND INJURY RATES COMPARED ON A 300-DAY BASIS, 1911 TO 1918.

The customary basis for computing fatality rates is the number of men employed in the industry. This basis is faulty in that the number of men reported on the pay roll is usually much in excess of the number of men actually "at work" full time. In every mining district there are men who work a few days at one mine and either quit or are discharged, and go to another mine. The actual number of men on the pay roll of any mine is, therefore, much larger than the number of men at work, and unfortunately it is too often the total number of names on the pay roll that is reported in lieu of the pay-roll shifts.

In comparing mine accidents, the time element must be taken into consideration. In other words, the length of time the man is exposed to the mining risk should be an important factor in arriving at the true hazard of the mining industry. The reports rendered by the individual mining companies usually show the average number of men employed and also the number of days the mine worked during the year. The number of days in operation varies from perhaps 50 to a maximum of 360 days. These working periods for each individual mine are used in connection with the average number of men reported employed, thus giving a reasonably close approximation of the total number of days' work performed during the year. As regards some of the larger companies the actual number of pay-roll shifts is reported. With the total number of days of labor as a basis a true comparison of mining accidents can be made, one State with another, or one year with another. As a mine can be worked only about 300 days in a year, if Sundays and holidays and a few days for repairs be excluded, this figure is used as a basis for calculating the number of full-time workers, simply dividing the total shifts by 300, thus making it possible to reduce all rates to a common base of 1,000 300-day workers. Having the total number of shifts, it is a simple matter to calculate accident rates on any number of shifts as a unit, some operators preferring 10,000 shifts in place of the basis used by the bureau, that of 1,000 300-day workers. The rates for previous years from 1911 to and including 1918 are on the 300-day basis. The reader will, therefore, bear in mind that unless otherwise stated all rates in this report are on the basis of 1,000 300-day (full-time) workers.

ACCIDENTS CLASSIFIED BY MINING METHODS.

In the bureau's report[a] for 1914 data relating to mine accidents were classified by mining methods for the first time. Similar data for 1915, 1916, 1917, and 1918 have been collected, thus placing the results of five years' work on a comparative basis.

Data on the classification of accidents according to systems of mining are essential for ascertaining the risk in the different mining methods. The bureau's accident-report cards, sent to the operators during recent years, requested that the method of mining be reported with the statistics of accidents. With these reports as a basis, the bureau was able to select the returns from 258 mining companies in 1914, 280 in 1915, 246 in 1916, 276 in 1917, and 319 in 1918, representing approximately 75 per cent of the metal-mining industry, whose records appear reasonably complete. Reports from companies whose data were not reasonably complete in all details were omitted in this study. Shop, yard, and other surface employees, as well as their accidents, were omitted. The figures given herein, therefore, include the actual number of men employed underground and in open-pit mines (excluding yard and shop men), with the corresponding number of accidents for each group. (See Table 20.)

Various methods of mining have been developed to work different types of ore bodies, and it is necessary to modify these methods to meet the requirements of each ore body if the ore is to be extracted at minimum cost and with least loss. Safety should be the first consideration, although many other factors have to be taken into account in laying out a mine. For the purpose of studying the mining hazard on the basis of mining methods, the returns received from the operators have been divided into six groups, as follows:

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[a] Fay, A. H., Metal-mine accidents in the United States during the calendar year 1914: Bureau of Mines, 1915, 96 pp.

Operators' reports grouped by mining methods.

Method.	Number of operators.			
	1915	1916	1917	1918
1. Room and pillar	52	62	57	92
2. Overhand stoping:				
(*a*) With stulls	17	22	20	20
(*b*) With square sets, cribs, etc	31	32	31	39
(*c*) With filling	62	21	27	19
(*d*) Shrinkage	28	13	19	17
3. Underhand stoping	5	5	8	21
4. Caving methods	50	61	69	60
5. Open pit, with steam shovel	23	23	32	31
6. Open pit, without steam shovel	12	7	13	20
Total	280	246	276	319

TABLE 20.—*Summary of metal-mine accident data, grouped by methods of mining, during the year ended Dec. 31, 1918.*

Method of mining.	Number companies represented.	Number States represented.	Days active.	Total days labor.	Number men employed in mines.	Number 300-day workers.	Number killed.			Number injured.		
							Total.	Per 1,000 employed.	Per 1,000 300-day workers.	Total.	Per 1,000 employed.	Per 1,000 300-day workers.
1. Room and pillar	92	19	267	2,770,389	10,385	9,235	**38**	3.66	4.11	**3,151**	303.42	341.20
2. Overhand stoping:												
(a) With stulls	20	11	317	911,844	2,876	3,039	**22**	7.65	7.24	**641**	222.88	210.92
(b) With square sets, cribs, etc	39	9	318	6,002,813	18,905	20,009	**76**	4.02	3.80	**8,205**	434.01	410.07
(c) With filling	19	6	321	1,425,165	4,438	4,750	**21**	4.73	4.42	**1,297**	292.25	273.05
(d) Shrinkage	17	9	302	536,882	1,776	1,790	**29**	16.33	16.20	**517**	291.10	288.83
3. Underhand stoping	21	11	329	1,580,302	4,810	5,268	**26**	5.41	4.94	**1,441**	299.58	273.54
4. Caving methods	60	9	306	5,880,814	19,191	19,603	**92**	4.79	4.69	**6,813**	355.01	347.55
5. Open pit, with steam shovel	31	10	309	3,199,222	10,337	10,664	**39**	3.77	3.66	**2,285**	221.05	214.27
6. Open pit, without steam shovel	20	15	296	530,631	1,792	1,769	**6**	3.35	3.39	**232**	129.46	131.15
Total, 1918	**319**	....	**307**	**22,838,062**	**74,510**	**76,127**	**349**	**4.68**	**4.58**	**24,582**	**329.92**	**322.91**
Total, 1917	276	....	304	24,808,172	81,611	82,694	**328**	4.02	3.97	**26,340**	322.75	318.52
Total, 1916	246	....	307	21,496,327	69,997	71,653	**291**	4.16	4.06	**28,576**	408.23	398.82
Total, 1915	280	....	303	22,842,999	75,365	76,140	**324**	4.29	4.25	**27,314**	362.42	358.73
Total, 1914	258	....	292	22,004,824	75,453	73,349	**361**	4.78	4.92	**24,306**	322.13	331.38

TABLE 21.—***FATALITIES****, classified by principal causes and mining methods, during the years ended Dec. 31, 1917 and 1918.*

Method of mining.	Number killed.																						
	By falls of rock.			By run or fall of ore while loading at chute, bin, or working face.			By explosives.			By haulage.			By falls of persons.			Miscellaneous.			In shaft.			Total.	
	1 and 31.[a]			**2, 7, and 37.**			**4 and 32.**			**5 and 33.**			**6 and 35.**			**3, 8, 9, 10, 11, 12, 13, 14, 15, 34, 36, 38, 39, 40, and 41.**			**16, 17, 18, 19, 20, and 21.**				
	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	**Number.**	Rate per 1,000 300-day workers.
1918.																							
Room and pillar	10	26.32	1.08	.....	.....	.....	8	21.05	0.86	2	5.26	0.22	.....	.....	.....	.....	.....	.....	18	47.37	1.95	**38**	4.11
Overhand stoping:																							
(a) With stulls	8	36.36	2.63	.....	.....	.....	.....	.....	.....	1	4.55	.33	.....	.....	.....	3	13.64	0.99	10	45.45	3.29	**22**	7.24
(b) With square sets, cribs, etc	33	43.42	1.65	6	7.90	0.30	10	13.16	.50	4	5.26	.20	2	2.63	0.10	9	11.84	.45	12	15.79	.60	**76**	3.80
(c) With filling	9	42.86	1.90	2	9.52	.42	1	4.76	.21	.....	.....	.....	2	9.52	.42	3	14.29	.63	4	19.05	.84	**21**	4.42
(d) Shrinkage	1	3.44	.56	1	3.44	.56	1	3.44	.56	1	3.44	.56	2	6.90	1.12	18	62.07	10.05	5	17.27	2.79	**29**	16.20
Underhand stoping	6	23.08	1.14	.....	.....	.....	3	11.54	.57	3	11.54	.57	.....	.....	.....	4	15.38	.76	10	38.46	1.90	**26**	4.94
Caving methods	38	41.30	1.94	2	2.17	.10	7	7.61	.36	6	6.52	.31	4	4.35	.20	22	23.92	1.12	13	14.13	.66	**92**	4.69
Open pit, with steam shovel	11	28.21	1.03	.....	.....	.....	9	23.08	.85	13	33.33	1.22	1	2.56	.09	5	12.82	.47	.....	.....	.....	**39**	3.66
Open pit, without steam shovel	2	33.33	1.13	.....	.....	.....	2	33.33	1.13	1	16.67	.56	1	16.67	.56	.....	.....	.....	.....	.....	.....	**6**	3.39
Total, 1918	**118**	**33.81**	**1.55**	**11**	**3.15**	**.14**	**41**	**11.75**	**.54**	**31**	**8.88**	**.41**	**12**	**3.44**	**.16**	**64**	**18.34**	**.84**	**72**	**20.63**	**.94**	**349**	**4.58**

1917.																						
Room and pillar	33	54.10	3.25	1	1.64	.10	7	11.47	.69	6	9.84	.59	2	3.28	.19	2	3.28	.19	10	16.39	.98	61	6.00
Overhand stoping:																							
(a) With stulls	5	45.46	1.27	......	......	......	1	9.09	.25	1	9.09	.25	1	9.09	.25	......	......	......	3	27.27	.76	11	2.78
(b) With square sets, cribs, etc	28	35.90	1.20	3	3.85	.13	12	15.39	.51	2	2.56	.08	5	6.41	.21	7	8.97	.30	21	26.92	.90	78	3.33
(c) With filling	11	40.74	1.75	......	......	......	......	......	......	1	3.70	.16	4	14.82	.64	6	22.22	.96	5	18.52	.80	27	4.31
(d) Shrinkage	4	22.22	1.41	2	11.11	.71	2	11.11	.71	......	......	......	2	11.11	.71	4	22.22	1.41	4	22.22	1.41	18	6.35
Underhand stoping	13	68.42	2.81	......	......	......	1	5.26	.21	3	15.79	.65	......	......	......	......	......	......	2	10.53	.43	19	4.10
Caving methods	36	42.35	1.81	3	3.53	.15	6	7.06	.30	13	15.30	.66	8	9.41	.40	3	8.53	.15	16	18.82	.81	85	4.28
Open pit, with steam shovel	9	31.04	.87	......	......	......	4	13.79	.39	13	44.83	1.26	......	......	......	3	10.34	.29	......	......	......	29	2.81
Open pit, without steam shovel	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......	......
Total, 1917	**139**	**42.38**	**1.68**	**9**	**2.74**	**.11**	**33**	**10.06**	**.40**	**39**	**11.89**	**.47**	**22**	**6.71**	**.27**	**25**	**7.62**	**.30**	**61**	**18.60**	**.74**	**328**	**3.97**

[a] Numbers refer to causes of accidents as shown on Table 23 and other similar tables.

TABLE 22.—***INJURIES***, *classified by principal causes and mining methods, during the years ended Dec. 31, 1917 and 1918.*

Method of mining.	Number injured.																					
	By falls of rock.			By run or fall of ore while loading at chute, bin, or working face.			By explosives.			By haulage.			By falls of persons.			Miscellaneous.			In shaft.			Total.	
	1 and 31.[a]			**2, 7, and 37.**			**4 and 32.**			**5 and 33.**			**6 and 35.**			**3, 8, 9, 10, 11, 12 13, 14, 15, 34.36, 38, 39, 40, and 41.**			**16, 17, 18, 19, 20, and 21.**				
	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	Number.	Per cent of total.	Rate per 1,000 300-day workers.	**Number.**	Rate per 1,000 300-day workers.
1918.																							
Room and pillar	430	13.65	46.56	749	23.77	81.10	43	1.36	4.66	544	17.26	58.90	50	1.59	5.41	1,124	35.67	121.72	211	6.70	22.84	**3,151**	341.20
Overhand stoping:																							
(*a*) With stulls	222	34.63	73.05	64	9.99	21.06	2	.31	.66	76	11.86	25.01	34	5.30	11.18	223	34.79	73.38	20	3.12	6.58	**641**	210.92
(*b*) With square sets, cribs.etc	2,277	27.75	113.80	1,126	13.72	56.28	71	.87	3.54	1,136	13.85	56.78	297	3.62	14.84	3,101	37.79	154.99	197	2.40	9.84	**8,205**	410.07
(*c*) With filling	213	16.42	44.84	285	21.98	60.00	8	.62	1.68	175	13.49	36.84	30	2.31	6.32	556	42.87	117.05	30	2.31	6.32	**1,297**	273.05
(*d*) Shrinkage	72	13.93	40.22	155	29.98	86.59	10	1.93	5.59	56	10.83	31.28	15	2.90	8.38	171	33.08	95.53	38	7.35	21.23	**517**	288.82
Underhand stoping	170	11.80	32.27	394	27.34	74.79	33	2.29	6.26	221	15.34	41.95	28	1.94	5.32	551	38.24	104.59	44	3.05	8.35	**1,441**	273.53
Caving methods	1,915	28.11	97.69	936	13.74	47.75	138	2.03	7.04	798	11.71	40.71	194	2.85	9.90	2,658	39 01	135.59	174	2.55	8.87	**6,813**	347.55
Open pit, with steam shovel	346	15.14	32.45	5	.22	.47	57	2.49	5.35	336	14.71	31.50	189	8.27	17.72	1,352	59.17	126.78	.....	......	......	**2,285**	214.27
Open pit, without steam shovel	81	34.91	45.79	.....	......	......	7	3.02	3.96	22	9.48	12.44	14	6.04	7.91	108	46.55	61.05	.....	......	......	**232**	131.15
Total, 1918	**5,726**	**23.29**	**75.22**	**3,714**	**15.11**	**48.79**	**369**	**1.50**	**4.85**	**3,364**	**13.69**	**44.19**	**851**	**3.46**	**11.18**	**9,844**	**40.05**	**129.31**	**714**	**2.90**	**9.37**	**24,582**	**322.91**

1917.																						
Room and pillar	402	13.61	39.57	734	24.86	72.25	31	1.05	3.05	707	23.94	69.60	88	2.98	8.66	858	29.06	84.46	133	4.50	13.09	2,953	290.68
Overhand stoping:																							
(*a*) With stulls	499	42.29	126.23	74	6.27	18.72	6	.51	1.52	134	11.36	33.90	41	3.47	10.37	403	34.15	101.95	23	1.95	5.82	1,180	298.51
(*b*) With square sets, cribs, etc	2,166	25.27	92.50	1,608	18.76	68.67	99	1.55	4.23	1,263	14.74	53.94	234	2.73	9.99	3,003	35.04	128.24	198	2.31	8.45	8,571	366.02
(*c*) With filling	577	26.38	92.01	276	12.62	44.01	36	1.64	5.74	253	11.57	40.35	50	2.29	7.97	887	40.56	141.45	108	4.94	17.22	2,187	348.75
(*d*) Shrinkage	128	11.35	45.18	367	32.54	129.54	20	1.77	7.06	148	13.12	52.24	22	1.95	7.77	395	35.02	139.43	48	4.25	16.94	1,128	398.16
Underhand stoping	77	5.58	16.63	402	29.13	86.81	9	.65	1.94	395	28.63	85.29	21	1.52	4.53	475	34.42	102.57	1	.07	.22	1,380	297.99
Caving methods	1,841	28.13	92.78	745	11.38	37.55	100	1.53	5.04	840	12.83	42.33	146	2.23	7.36	2,711	41.42	136.62	162	2.48	8.16	6,545	329.84
Open pit, with steam shovel	380	16.62	36.79	17	.74	1.64	75	3.28	7.26	304	13.29	29.43	223	9.75	21.59	1,288	56.32	124.68	.....	.....	.....	2,287	221.39
Open pit, without steam shovel	24	22.02	19.09	.....	.....	.....	16	14.68	12.73	21	19.27	16.71	2	1.83	1.59	46	42.20	36.59	.....	.....	.....	109	86.71
Total, 1917	**6,094**	**23.14**	**73.69**	**4,223**	**16.03**	**51.06**	**392**	**1.49**	**4.74**	**4,065**	**15.43**	**49.17**	**827**	**3.14**	**10.00**	**10,066**	**38.22**	**121.72**	**673**	**2.55**	**8.14**	**26,340**	**318.52**

[a] See footnote, Table 21.

TABLE 23.—*METAL-MINE ACCIDENTS in 1918,*

NUMBER KILLED.

Method of mining.	Underground.									
	Fall of rock or ore from roof or wall.	Rock or ore while loading at working face.	Timber or hand tools.	Explosives.	Haulage accidents.	Falling down chute, winze, raise, or stope.	Run of ore from chute or pocket.	Drilling accidents.	Electricity.	Machinery (not including locomotives or drills).
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Room and pillar	10	......	......	8	2	......	......	......	......	......
Overhand stoping:										
(*a*) With stulls	8	......	......	......	1	......	......	......	1	......
(*b*) With square sets, cribs, etc.	33	6	1	10	4	2	......	......	3	1
(*c*) With filling	9	1	......	1	......	2	1	......	1	......
(*d*) Shrinkage	1	1	......	1	1	2	......	......	......	......
Underhand stoping	6	......	1	3	3	......	......	......	......	......
Caving methods	38	1	2	7	6	4	1	2	6	......
Open pit, with steam shovel	......	......	......	......	......	......	......	......	......	......
Open pit, without steam shovel	......	......	......	......	......	......	......	......	......	......
Total, 1918	**105**	**9**	**4**	**30**	**17**	**10**	**2**	**2**	**11**	**1**
Total, 1917	130	8	1	29	26	22	1	1	4	1
Total, 1916	109	6	1	35	23	15	3	......	6	1
Total, 1915	147	6	5	32	12	30	9	......	10	......
Total, 1914	141	4	2	32	25	33	2	1	6	1

NUMBER INJURED.

Room and pillar	430	712	88	43	544	50	37	308	8	44
Overhead stoping:										
(*a*) With stulls	222	56	80	2	76	34	8	49	2	1
(*b*) With square sets, cribs, etc.	2,277	1,062	848	71	1,136	297	64	437	20	26
(*c*) With filling	213	215	159	8	175	30	70	107	3	3
(*d*) Shrinkage	72	136	20	10	56	15	19	56	1	4
Underhand stoping	170	373	86	33	221	28	21	141	20	56
Caving methods	1,915	625	916	138	798	194	311	265	32	54
Open pit, with steam shovel	......	......	......	......	......	......	......	......	......	......
Open pit, without steam shovel	......	......	......	......	......	......	......	......	......	......
Total, 1918	**5,299**	**3,179**	**2,197**	**305**	**3,006**	**648**	**530**	**1,363**	**86**	**188**
Total, 1917	5,690	3,795	2,660	301	3,740	602	411	1,342	53	114
Total, 1916	6,079	4,385	2,668	652	3,740	570	743	1,648	84	150
Total, 1915	5,912	3,788	2,965	262	3,323	696	614	1,851	66	427
Total, 1914	5,570	3,251	2,579	274	3,043	753	593	1,330	43	161

by causes, grouped by mining methods.

NUMBER KILLED.

Underground—Continued.						Shaft.						
Mine fires.	Suffocation from natural gases.	Inrush of water.	Stepping on nail.	Other causes.	**Total, underground.**	Falling down shafts	Objects falling down shafts.	Breaking of cables.	Overwinding.	Skip or cage.	Other causes.	**Total, shaft.**
11	**12**	**13**	**14**	**15**		**16**	**17**	**18**	**19**	**20**	**21**	
......	......	......	......	......	**20**	**7**	**3**	......	......	7	**1**	**18**
......	......	**2**	......	......	**12**	**4**	......	......	......	5	**1**	10
......	......	......	......	**4**	**64**	**4**	**1**	**2**	**1**	3	**1**	**12**
......	......	......	......	**2**	**17**	**1**	**2**	......	......	1	......	**4**
......	......	18	......	......	**24**	......	**3**	......	......	**2**	......	**5**
......	**1**	......	......	**2**	**16**	**3**	**1**	......	**2**	3	**1**	**10**
3	......	**2**	**1**	**6**	**79**	**4**	**2**	......	......	7	......	**13**
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......	......
3	**1**	**22**	**1**	**14**	**232**	**23**	**12**	**2**	**3**	**28**	**4**	**72**
3	**1**	**2**	......	**9**	**238**	**17**	**11**	**1**	**1**	**23**	**8**	**61**
4	**1**	......	......	**8**	**212**	**21**	**10**	......	......	**18**	**3**	**52**
......	**1**	......	**1**	**3**	**256**	**12**	**8**	**2**	**1**	**12**	**6**	**41**
2	......	**8**	......	**4**	**261**	**22**	**7**	......	......	**33**	**9**	**71**

NUMBER INJURED.

......	7	......	73	596	**2,940**	8	57	**1**	......	98	47	**211**
......	......	......	7	84	**621**	......	4	......	......	12	4	20
1	**4**	......	222	1,543	**8,008**	**11**	**74**	**1**	**1**	67	43	197
......	**4**	......	22	258	**1,267**	**1**	8	......	......	16	5	30
......	......	1	10	79	**479**	**1**	15	**1**	......	8	13	33
......	3	3	16	226	**1,397**	**1**	12	3	......	19	9	44
3	8	**2**	**175**	1,203	**6,639**	**7**	33	**2**	......	56	76	174
......	......	......	......	......	......	......	......	......	......	......	......	......
......	......	......	......	......	......	......	......	......	......	......	......	......
4	**26**	**6**	**525**	**3,989**	**21,351**	**29**	**203**	**8**	**1**	**276**	**197**	714
36	21	**2**	465	4,039	**23,271**	29	214	**5**	**3**	212	210	**673**
16	22	**2**	453	4,009	**25,221**	63	238	**4**	**1**	240	285	**831**
40	71	28	622	3,945	**24,610**	31	235	**3**	**1**	185	199	654
6	15	12	215	3,423	**21,268**	34	149	**3**	**2**	218	165	**571**

TABLE 23.—*METAL-MINE ACCIDENTS in 1918,*

NUMBER KILLED.

Method of mining.	Surface.									
	Mine cars, mine locomotives, or aerial trams. **22**	Railway cars and locomotives. **23**	Run or fall of ore in or from ore bins. **24**	Falls of persons. **25**	Stepping on nail. **26**	Hand tools, axes, bars, etc. **27**	Electricity. **28**	Machinery. **29**	Other causes. **30**	**Total surface.**
Room and pillar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Overhand stoping:										
(*a*) With stulls	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(*b*) With square sets, cribs, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(*c*) With filling	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(*d*) Shrinkage	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Underhand stoping	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caving methods	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit, with steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit, without steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

NUMBER INJURED.

Method of mining.	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**Total surface.**
Room and pillar	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Overhand stoping:										
(*a*) With stulls	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(*b*) With square sets, cribs, etc	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(*c*) With filling	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
(*d*) Shrinkage	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Underhand stoping	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Caving methods	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit, with steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Open pit, without steam shovel	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1918	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1917	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1916	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1915	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total, 1914	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

Original from PRINCETON UNIVERSITY

by causes, ***grouped by mining methods***—Continued.

NUMBER KILLED.

Open pit.												Grand total.				
Falls or slides of rock or ore.	Explosives.	Haulage accidents (locomotives, etc.).	Steam shovels.	Falls of persons.	Falls of derricks, booms, etc.	Run or fall of ore in or from ore bins.	Machinery (other than locomotives or steam shovels).	Electricity.	Hand tools.	Other causes.	Total, open pit.					
31	32	33	34	35	36	37	38	39	40	41		1918	1917	1916	1915	1914
....	....	....	....	....	....	....	....	....	....	....	....	38	61	47	27	48
....	....	....	....	....	....	....	....	....	....	....	....	22	11	21	10	181
....	....	....	....	....	....	....	....	....	....	....	....	76	78	55	47	
....	....	....	....	....	....	....	....	....	....	....	....	21	27	35	99	
....	....	....	....	....	....	....	....	....	....	....	....	29	18	14	36	
....	....	....	....	....	....	....	....	....	....	....	....	26	19	12	11	
....	....	....	....	....	....	....	....	....	....	....	....	92	85	80	67	103
11	9	13	2	1	....	....	....	....	....	3	39	39	29	27	24	24
2	2	1	....	1	....	....	....	....	....	....	6	6	0	0	3	5
13	11	14	2	2	....	....	....	....	....	3	45	349	....	....	....	....
9	4	13	2	....	....	....	1	....	....	....	29	....	328	....	....	....
5	7	11	....	....	....	....	....	1	....	3	27	....	....	291	....	....
5	1	16	1	1	1	....	....	....	....	2	27	....	....	....	324	....
9	8	9	1	....	....	....	2	....	....	....	29	....	....	....	....	361

NUMBER INJURED.

31	32	33	34	35	36	37	38	39	40	41	Total, open pit.	1918	1917	1916	1915	1914
....	....	....	....	....	....	....	....	....	....	....	....	3,151	2,953	4,013	2,819	3,171
....	....	....	....	....	....	....	....	....	....	....	....	641	1,180	1,824	1,290	12,372
....	....	....	....	....	....	....	....	....	....	....	....	8,205	8,571	7,661	4,480	
....	....	....	....	....	....	....	....	....	....	....	....	1,297	2,187	2,584	7,654	
....	....	....	....	....	....	....	....	....	....	....	....	517	1,128	1,129	2,244	
....	....	....	....	....	....	....	....	....	....	....	....	1,441	1,380	1,707	976	
....	....	....	....	....	....	....	....	....	....	....	....	6,813	6,545	7,134	5,801	6,296
346	57	336	189	189	8	5	79	1	240	835	2,285	2,285	2,287	2,416	1,908	2,297
81	7	22	13	14	....	....	12	1	16	66	232	232	109	108	142	170
427	64	358	202	203	8	5	91	2	256	901	2,517	24,582	....	....	....	....
404	91	325	262	225	10	17	62	1	216	783	2,396	....	26,340	....	....	....
428	46	321	169	131	3	12	52	6	187	1,169	2,524	....	....	28,576	....	....
465	39	216	85	188	9	9	67	3	188	781	2,050	....	....	....	27,314	....
484	112	299	146	249	4	3	79	4	258	829	2,467	....	....	....	....	24,306

Table 23*a* shows a five-year summary of fatal and nonfatal injuries at metal mines wherein the accidents are classified according to mining methods and principal causes of accidents. It will be noted, for example, that in the room-and-pillar method of mining 24.54 per cent of the nonfatal injuries and 0.90 per cent of the fatalities occurred as a result of accidents in handling ore or rock during loading. It also appears that in underhand stoping 23.8 per cent of the injuries and 13.24 per cent of the fatalities are due to some phase of the haulage system. Other comparisons for various mining methods and by causes may be gleaned from the table. The fatality rate in the room-and-pillar method, based on a five-year study, is 5.14 per 1,000 300-day workers, being the highest of any one of the six methods studied. The nonfatal injury rate is highest in overhand stoping, being 376.19 per 1,000 300-day workers.

TABLE 23A.—*Accidents compared by mining methods and causes for the five-year period 1914 to 1918, inclusive.*

[Numbers in italics show largest percentage of accidents due to any one cause, regardless of mining method.]

	Room and pillar.		Overhand stoping.		Underhand stoping.		Caving methods.		Open pit.			
									Steam shovel.		Without steam shovel.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
NONFATAL INJURIES.												
Falls of rock (roof or bank)	2,289	14.21	16,224	24.97	395	7.18	9,642	*29.59*	2,002	17.89	206	27.07
Run or fall of rock or ore while loading	3,953	*24.54*	12,114	18.64	1,568	28.48	3,654	11.21	39	.34	7	.92
Explosives	247	1.53	715	1.10	276	*5.01*	556	1.69	318	2.84	34	4.47
Haulage	3,191	19.81	8,160	12.56	1,310	*23.80*	4,191	12.87	1,392	12.44	127	16.69
Falls of persons	289	1.79	2,152	3.31	79	1.44	749	2.30	958	*8.56*	38	4.99
Miscellaneous	5,357	33.27	23,932	36.85	1,797	32.65	12,881	39.53	6,484	*57.93*	349	45.86
Shaft	781	*4.85*	1,667	2.57	79	1.44	916	2.81	......	......	......	......
Total nonfatal injuries	16,107	100.00	64,964	100.00	5,504	100.00	32,589	100.00	11,193	100.00	761	100.00
FATALITIES.												
Falls of rock (roof or bank)	103	46.61	316	40.46	29	42.65	184	43.09	34	23.77	7	*50.00*
Run or fall of rock or ore while loading	2	.90	32	*4.10*	2	2.94	14	3.28	......	......	......	......
Explosives	39	17.65	70	8.96	8	11.76	41	9.60	29	*20.28*	2	14.29
Haulage	23	10.41	33	4.22	9	13.24	38	8.90	61	*42.66*	2	14.29
Falls of persons	7	3.17	69	8.84	1	1.47	33	7.73	1	.70	2	*14.29*
Miscellaneous	8	3.62	87	11.14	5	7.35	46	10.77	18	*12.59*	1	7.14
Shaft	39	17.64	174	*22.28*	14	20.59	71	16.63	......	......	......	......
Total fatalities	221	100.00	781	100.00	68	100.00	427	100.00	143	100.00	14	100.00
Number of 300-day workers	42,989		172,686		15,532		96,581		47,983		6,192	
Nonfatal accident rate per 1,000 300-day workers	**374.67**		**376.19**		**354.36**		**337.43**		**233.27**		**122.90**	
Fatality rate per 1,000 300-day workers	**5.14**		**4.52**		**4.38**		**4.42**		**2.98**		**2.26**	

ROOM-AND-PILLAR SYSTEM.

The data tabulated herein represent the returns from selected operators, employing about 10,000 men. The room-and-pillar system of mining is used largely in flat deposits, as, for example, the lead deposits of southeastern Missouri and the sheet-ground of Joplin. It is also applied in certain bedded iron-ore deposits.

Number killed and injured in mines using ***room-and-pillar*** *method of mining during the calendar years 1914 to 1918.*

Cause.	Killed.					Injured.				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Falls of rock	22	17	21	33	10	465	401	591	402	430
Run or fall of rock or ore in loading	1	......	......	1	......	726	746	998	734	749
Explosives	8	7	9	7	8	70	45	58	31	43
Haulage	8	......	7	6	2	718	429	793	707	544
Falls of persons	2	1	2	2	......	54	29	68	88	50
Miscellaneous	4	......	2	2	......	1,057	1,045	1,273	858	1,124
Shaft	3	2	6	10	18	81	124	232	133	211
Total	48	27	47	61	38	3,171	2,819	4,013	2,953	3,151
Per 1,000 300-day workers	5.73	3.97	5.59	6.00	4.11	378.63	413.95	477.17	290.68	341.20

OVERHAND STOPING.

Overhand stoping is more largely used than any other underground method of mining. This method has many variations, as indicated in Tables 20 and 21, where the accident data tabulated represent properties in which stulls, square sets and cribs, filling, and shrinkage methods were employed. The following table gives the combined figures for the four subdivisions under overhand stoping for a five-year period:

Number killed and injured in mines where ***overhand stoping*** *was principal method used during the calendar years 1914 to 1918.*

Cause.	Killed.					Injured.				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Fall of rock	77	89	51	48	51	3,060	3,579	3,431	3,370	2,784
Run or fall of rock or ore in loading	3	10	5	5	9	2,520	2,922	2,717	2,325	1,630
Explosives	17	16	10	15	12	125	134	204	161	91
Haulage	8	9	6	4	6	1,544	1,771	1,604	1,798	1,443
Falls of persons	25	21	5	12	6	556	519	354	347	376
Miscellaneous	8	13	16	17	33	4,277	6,391	4,525	4,688	4,051
Shaft	43	35	32	33	31	290	352	363	377	285
Total	181	193	125	134	148	12,372	15,668	13,198	13,066	10,660
Per 1,000 300-day workers	5.11	4.71	4.13	3.67	5.00	345.91	382.72	436.44	358.23	360.27

UNDERHAND STOPING.

The accompanying table gives separate data on underhand stoping including returns from operators whose major mining method is underhand stoping.

Number killed and injured in mines where **underhand stoping** *was principal method used during the calendar years 1914 to 1918.*

Cause.	Killed.					Injured.				
	[a] 1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Falls of rock	......	7	3	13	6	....	53	95	77	170
Run or fall of rock or ore in loading	......	1	1	......	......	....	248	524	402	394
Explosives	......	1	3	1	3	....	17	217	9	33
Haulage	......	1	2	3	3	....	329	365	395	221
Falls of persons	......	......	1	......	......	....	6	24	21	28
Miscellaneous	......	......	1	......	4	....	312	459	475	551
Shaft	......	1	1	2	10	....	11	23	1	44
Total	......	11	12	19	26	....	976	1,707	1,380	1,441
Per 1,000 300-day workers.	......	5.72	3.23	4.10	4.94	....	507.80	460.11	297.99	273.53

[a] No data available.

CAVING SYSTEMS.

Data relating to caving systems of mining represent the returns of representative operators employing about 20,000 men, and include largely the iron mines of Minnesota and Michigan and a number of copper mines in Arizona, California, and Utah. Many different names are applied to caving systems, but the principle is similar for all. The methods comprised in this classification are top slicing, substoping, block caving, pillar caving, etc., and the preliminary work that is absolutely necessary for any caving system.

Number killed and injured in mines using the **caving** *system of mining during the calendar years 1914 to 1918.*

Cause.	Killed.					Injured.				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Falls of rock	42	34	34	36	38	2,045	1,879	1,962	1,841	1,915
Run or fall of rock or ore in loading	2	4	3	3	2	598	486	889	745	936
Explosives	7	8	13	6	7	79	66	173	100	138
Haulage	9	2	8	13	6	781	794	978	840	798
Falls of persons	6	8	7	8	4	143	142	124	146	194
Miscellaneous	12	7	2	3	22	2,450	2,267	2,795	2,711	2,658
Shaft	25	4	13	16	13	200	167	213	162	174
Total	103	67	80	85	92	6,296	5,801	7,134	6,545	6,813
Per 1,000 300-day workers.	5.41	3.79	3.92	4.28	4.69	330.44	328.13	349.71	329.84	347.55

OPEN-PIT MINING WITH STEAM SHOVEL.

The returns from mines that used the open-pit method of mining with steam shovels represent typical companies employing about 10,000 men. These mines include many of the large open-pit iron mines of Minnesota and Alabama and the copper mines in Nevada, New Mexico, and Utah. The accompanying table shows the fatalities and injuries by principal causes from 1914 to 1918, inclusive.

Number killed and injured in ***open-pit*** *mines where the ore was mined by steam shovel during the calendar years 1914 to 1918.*

Cause.	Killed.					Injured.				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Falls of rock	5	4	5	9	11	425	449	402	380	346
Run or fall of rock or ore in loading	......	......	......	......	......	......	8	9	17	5
Explosives	8	1	7	4	9	107	38	41	75	57
Haulage	8	16	11	13	13	271	194	287	304	336
Falls of persons	......	......	......	......	1	238	179	129	223	189
Miscellaneous	3	3	4	3	5	1,256	1,040	1,548	1,288	1,352
Shaft	......	......	......	......	......	......	......	......	......	......
Total	24	24	27	29	39	2,297	1,908	2,416	2,287	2,285
Per 1,000 300-day workers.	2.73	3.16	3.15	2.81	3.66	261.00	250.79	281.58	221.39	214.27

OPEN-PIT MINING WITHOUT STEAM SHOVEL.

The data compiled represent the returns of representative operators using open-pit methods, but without steam shovel. The accident rate with this system of mining is considerably lower than in any other, largely because of the lack of machinery and also the advantages of daylight in all of the operations. This method is comparable with quarrying, so far as hazards are concerned.

Number killed and injured in ***open-pit*** *mines where no steam shovels were used during the calendar years 1914 to 1918.*

Cause.	Killed.					Injured.				
	1914	1915	1916	1917	1918	1914	1915	1916	1917	1918
Falls of rock	4	1	......	......	2	59	16	26	24	81
Run or fall of rock or ore in loading	......	......	......	......	......	3	1	3	......	......
Explosives	......	......	......	......	2	5	1	5	16	7
Haulage	1	......	......	......	1	28	22	34	21	22
Falls of persons	......	1	......	......	1	11	9	2	2	14
Miscellaneous	......	1	......	......	......	64	93	38	46	108
Shaft	......	......	......	......	......	......	......	......	......	......
Total	5	3	0	0	6	170	142	108	109	232
Per 1,000 300-day workers.	2.98	2.54	......	......	3.39	101.49	120.03	348.39	86.71	131.15

METAL-MINE, COAL-MINE, AND QUARRY ACCIDENTS COMPARED.

Comparative data for accidents at metal mines, coal mines, and quarries of the United States are shown in Tables 24 and 25.

TABLE 24.—*Fatality rates in different branches of mineral industries in 1918 compared on a 300-day basis.*

[Length of shift not considered.]

Branch of mineral industry.	Average days active.	Men employed.		Days of labor performed.	Killed.	Number killed per 1,000 employed.	
		Actual number.	Equivalent in 300-day workers (calculated).			On actual-time basis.	On 300-day basis.
Metal mines	297	182,606	181,006	54,301,748	646	3.54	3.57
Metallurgical works:							
Ore-dressing plants	310	21,809	22,517	6,754,962	35	1.60	1.55
Smelters [a]	342	39,899	45,439	13,631,601	42	1.05	.92
Auxiliary works	334	18,044	20,111	6,033,184	17	.94	.85
Coal mines	258	762,426	654,973	196,491,984	2,579	3.38	3.94
Coke ovens:							
Beehive	300	16,442	16,436	4,930,694	19	1.16	1.16
By-product	358	15,947	19,040	5,711,994	54	3.39	2.84
Quarries (inside)	252	44,082	37,042	11,112,556	81	1.84	2.19
Quarries (outside)	275	24,250	22,243	6,672,948	44	1.81	1.98
Total, 1918	**272**	**1,125,505**	**1,018,807**	**305,641,671**	**3,517**	**3.13**	**3.45**
Total, 1917	266	1,156,645	1,025,916	307,774,565	3,871	3.35	3.77
Total, 1916	255	1,128,257	957,393	287,218,232	3,224	2.86	3.37

[a] Does not include iron and steel industry.

Because of the great disasters that have happened in coal mines and the prominence given these by the press, coal mining is usually considered much more hazardous than metal mining. The latter, as the figures show, does not claim its death toll in disasters that involve many men, most of the men who die from accidents being killed one at a time.

Percentages of men killed by various causes, also the number employed and the number killed, in metal mines, coal mines, and quarries in the United States are shown in the accompanying tables.

TABLE 25.—***METAL MINES, COAL MINES, AND QUARRIES:*** *Principal causes of fatalities, showing percentage due to each cause, 1911 to 1918, by years.*

Industry.	Cause of death.								Total.
	Falls of overburden, roof, quarry material, ore, or coal.	Explosives.	Haulage and handling rock, ore, or coal.	Falls of person.	Electricity.	Machinery	Gas and dust explosions.	Other causes.	
1911:									
Metal mines	**32.52**	**11.22**	**7.63**	**15.39**	**2.45**	**3.16**	....	**27.63**	**100.00**
Coal mines	47.40	6.02	17.13	1.28	3.73	1.51	13.74	9.19	100.00
Quarries	25.53	26.60	20.21	8.51	1.07	9.04	....	9.04	100.00
1912:									
Metal mines	**34.49**	**14.22**	**10.28**	**13.92**	**3.78**	**3.78**	....	**19.52**	**100.00**
Coal mines	49.03	6.08	19.14	1.36	3.64	1.65	11.99	7.11	100.00
Quarries	17.37	22.06	27.70	8.92	1.87	11.74	....	10.33	100.00
1913:									
Metal mines	**34.70**	**13.03**	**12.88**	**12.30**	**3.81**	**4.39**	....	**18.89**	**100.00**
Coal mines	45.39	4.95	18.31	1.80	3.16	1.80	18.45	6.14	100.00
Quarries	14.75	24.04	23.50	9.29	2.73	12.57	....	13.12	100.00
1914:									
Metal mines	**36.32**	**10.73**	**10.20**	**16.10**	**3.04**	**2.50**	....	**21.11**	**100.00**
Coal mines	46.09	5.95	18.79	2.85	4.07	1.87	14.22	6.16	100.00
Quarries	29.45	19.44	18.33	12.78	1.67	6.11	....	12.22	100.00
1915:									
Metal mines	**36.71**	**14.10**	**10.49**	**15.91**	**2.53**	**1.99**	....	**18.26**	**100.00**
Coal mines	47.55	6.83	18.64	1.37	4.36	1.68	13.40	6.17	100.00
Quarries	30.40	18.92	15.55	11.48	2.03	9.46	....	12.16	100.00
1916.									
Metal mines	**32.28**	**12.77**	**10.04**	**14.64**	3.73	**2.58**	....	**23.96**	**100.00**
Coal mines	47.84	6.56	20.89	1.39	4.36	1.89	10.15	6.92	100.00
Quarries	19.08	16.18	19.66	8.09	4.05	16.76	....	16.18	100.00
1917:									
Metal mines	**26.17**	**9.27**	**10.33**	**13.15**	2.23	**2.00**	....	**36.85**	**100.00**
Coal mines	45.18	4.12	22.11	.96	3.52	2.34	13.43	8.34	100.00
Quarries	18.32	16.03	24.43	11.45	1.52	15.27	....	12.98	100.00
1918:									
Metal mines	**29.72**	**13.78**	**13.00**	**12.85**	**3.87**	**3.25**	....	**23.53**	**100.00**
Coal mines	50.13	5.24	24.20	.81	3.99	2.21	5.01	8.41	100.00
Quarries	14.40	13.60	24.80	12.00	3.20	14.40	....	17.60	100.00

MINING FATALITIES DUE TO EXPLOSIVES.

The accompanying table shows the number of fatalities due to the use of explosives in mining. From 9 to 14 per cent of the metal-mine fatalities and 14 to 26 per cent of the quarry fatalities are due to explosives, while about 6 per cent of the fatalities at coal mines are due to explosives.

Number and percentage of fatalities, due to explosives, at mines and quarries in the United States.

Year.	Metal mines.		Quarries.		Coal mines.	
	Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
1911	78	11.22	50	26.60	160	6.02
1912	94	14.22	47	22.06	147	6.08
1913	89	13.03	44	24.04	138	4.95
1914	60	10.73	35	19.44	146	5.95
1915	78	14.10	28	18.92	155	6.83
1916	89	12.77	28	16.18	146	6.56
1917	79	9.27	21	16.03	111	4.12
1918	89	13.78	17	13.60	135	5.24

PRODUCTION AND DISTRIBUTION OF EXPLOSIVES, 1918.[a]

The total production, excluding the amount exported, of explosives in the United States during the calendar year 1918, according to figures that the Bureau of Mines has received from manufacturers, was 499,224,660 pounds (249,612 short tons), as compared with 582,475,327 pounds (291,238 short tons) in 1917.

The production for 1918 is segregated as follows: Black blasting powder, 246,663,350 pounds; "high" explosives other than permissible explosives, 206,516,077 pounds; and permissible explosives, 46,045,233 pounds. These figures represent a decrease of 30,455,175 pounds of black powder, 55,800,003 pounds of high explosives, and an increase of 3,004,511 pounds of permissible explosives as compared with figures for 1917.

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[a] Fay, A. H. Production of explosives in the United States, 1918: Tech. Paper 231, Bureau of Mines, 1919, 21 pp.

DISTRIBUTION OF EXPLOSIVES BY PRINCIPAL INDUSTRIES.

Table 26 shows the percentages of black blasting powder, high explosives, and permissible explosives used in the various branches of the mining industry. For example, in 1918, 87.7 per cent of the black blasting powder was used in mining coal and only 3 per cent for other mining. In 1918 the mining industry of the United States used 80 per cent of all the explosives produced in this country, as compared with 76.4 per cent in 1917. Of the total amount of permissible explosives used in 1918, 80.9 per cent were used in coal mining and 9.9 per cent for other mining. Of high explosives other than permissible explosives, only a small percentage of the production is used for mining coal and approximately 50 per cent is used for other mining.

TABLE 26.—*Percentage of explosives used for various purposes in the United States during 1915, 1916, 1917, and 1918.*

	Coal mining.	Other mining.	Railway and other construction work.	All other purposes.	Total.
1918.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
Black powder	87.7	3.0	2.2	7.1	100.0
High explosives	15.2	49.6	5.8	29.4	100.0
Permissible explosives	80.9	9.9	.4	8.8	100.0
Total	**57.1**	**22.9**	**3.5**	**16.5**	**100.0**
1917.					
Black powder	85.1	3.4	4.7	6.8	100.0
High explosives	10.8	50.4	7.8	31.0	100.0
Permissible explosives	76.5	14.2	.2	9.1	100.0
Total	**51.0**	**25.4**	**5.7**	**17.9**	**100.0**
1916.					
Black powder	82.1	3.6	5.0	9.3	100.0
High explosives	8.2	51.6	8.6	31.6	100.0
Permissible explosives	76.6	17.9	.3	5.2	100.0
Total	**44.4**	**28.8**	**6.5**	**20.3**	**100.0**
1915.					
Black powder	84.8	3.4	3.6	8.2	100.0
High explosives	9.5	46.3	9.4	34.9	100.1
Permissible explosives	79.9	17.1	.5	2.5	100.0
Total	**45.9**	**26.1**	**6.4**	**21.5**	**99.9**

Original from PRINCETON UNIVERSITY

FIRES AT METAL MINES.

In view of the seriousness of fires in metal mines, there is published herewith a list showing many of the important and disastrous mine fires that have occurred in the metal mines of the United States since 1867. This list is far from complete, either as to details concerning the fires or as to the actual number. The list presents at least one reference in a technical paper where some information, although not complete, may be obtained concerning each individual fire. As the dates are given, those persons who are interested can search through other technical papers where additional information on each of the fires may be found. Several of these fires, like those at the United Verde and Neversweat and others, have resulted from excessive oxidation in old stopes and have been burning for a number of years. The use of candles seems to increase the fire hazard, as is indicated by the list.

Corrections or additions to this list will be gladly received by the bureau and incorporated in a revised list at some later date. Such data should be sent to the Statistical Section, Bureau of Mines, Washington, D. C.

Metal-mine fires in the United States.

[Incomplete.]

Date.	Name of mine.	Location.	Number killed.	Cause.	Reference.
Sept. 8, 1867	Ione	Grass Valley, Calif	2	"Fire had been built" on lower level. Men died from asphyxia due to smoke.	Min. and Sci. Press, vol. 15, p. 175.
Apr. 7, 1869	Kentuck, Yellow Jacket, Crown Point.	Gold Hill, Nev	41	Timbers "took fire," probably from candles	Min. and Sci. Press, vol. 18, pp. 228, 248, 257, 281.
Sept. 20, 1873	Yellow Jacket	do	6	From a blacksmith forge on 1,300-level	Min. and Sci. Press, vol. 27, pp. 200, 216.
Oct. 30, 1874	Belcher	Virginia City, Nev	3	Not definitely known	Min. and Sci. Press, vol. 29, p. 296; Eng. and Min. Jour., vol. 18, p. 322.
Nov. 10, 1880	Goodshow	Bodie, Calif	4	Hoisting works burned, suffocating men on 600-level.	Eng. and Min. Jour., vol. 30, p. 317.
Nov. 12, 1880	Chrysolite	Leadville, Colo	2	Breaking out of an old fire	Eng. and Min. Jour., vol. 30, p. 329.
Feb. 16, 1881	Belmont	Belmont, Mont	6	Fire from blacksmith shop communicated to shaft.	Min. and Sci. Press, vol. 42, p. 152.
Oct. 5–10, 1884	Calumet & Hecla	Calumet, Mich	2	Fire in timbers, eleventh level; unknown	Eng. and Min. Jour., vol. 38, p. 241.
Nov. 13, 1885	Bull–Domingo	Silver Cliff, Colo	10	Box of dynamite exploded in boiler room; head-frame burned; men in mine suffocated.	Eng. and Min. Jour., vol. 40, pp. 358, 374.
June 24, 1887	Gould & Curry	Virginia City, Nev	6	Unknown	Eng. and Min. Jour., vol. 44, pp. 13, 48.
Nov. 23, 1889	Neversweat–St. Lawrence	Butte, Mont	6	Candle in chute on 400-level	Min. and Sci. Press, vol. 48, p. 485.
June 29, 1891	Chapin	Iron Mountain, Mich	8	On sixth level; unknown	Eng. and Min. Jour., vol. 51, pp. 149, 176.
Apr. 21, 1893	Silver Bow No. 2	Butte, Mont	9	No details	Eng. and Min. Jour., vol. 55, p. 447.
Apr. 24, 1894	Amethyst	Creede, Colo	4	Burning shaft house; men in mine suffocated	Eng. and Min. Jour., vol. 58, p. 205.
Dec. —, 1894	Perigo	Black Hawk, Colo	4	Match in box of giant powder; tunnel timbers burned.	Eng. and Min. Jour., vol. 58, p. 565.
Mar. 10, 1895	Old Abe	White Oaks, N. Mex	8	Burning shaft house and shaft timbers	Eng. and Min. Jour., vol. 59, p. 254.
Sept. 7, 1895	Osceola	Osceola, Mich	30	On twenty-seventh level; unknown	Eng. and Min. Jour., vol. 60, pp. 258, 281.
Apr. 9, 1896	Hope	Basin, Mont	7	Unknown	Eng. and Min. Jour., vol. 61, p. 359.
Feb. 2, 1897	North Tamarack	Houghton, Mich		do	Eng. and Min. Jour., vol. 63, p. 145.
Aug. 17, 1897	Utica	Angels, Calif		Spontaneous combustion	Eng. and Min. Jour., vol. 64, p. 224.
Sept. —, 1897	Bessemer No. 2	Blockton, Ala		Unknown	Eng. and Min. Jour., vol. 64, p. 405.
Jan. 4, 1898	Neversweat–St. Lawrence	Butte, Mont	2	Candle in stope	Eng. and Min. Jour., vol. 65, p. 82.
Nov. 20, 1901	Smuggler–Union	Telluride, Colo	25	Fire in bunk house at mine entrance	Eng. and Min. Jour., vol. 72, pp. 657, 685, 689, 731, 732, 856.
Feb. 22, 1903	Spruce No. 3	New Hibbing, Minn	2	Unknown	Eng. and Min. Jour., vol. 75, p. 347.
Nov. 6, 1903	Kearsarge	Virginia City, Mont	9	do	Eng. and Min. Jour., vol. 76, p. 753.
Jan. —, 1906	East Colusa	Butte, Mont		Probably spontaneous	
Nov. 30, 1907	Fremont	Drytown, Calif	11	Fire at foot of shaft; unknown	Eng. and Min. Jour., vol. 84, pp. 1084, 1137.
May —, 1907	Minnie Healey–Leonard	Butte, Mont		Unknown	
Nov. 16, 1908	No. 3	Pratt City, Ala	13	Incendiary	Eng. and Min. Jour., vol. 86, pp. 1071, 1116.
Nov. 29, 1909	London	Copperhill, Tenn		Shaft house; unknown	Bureau of Mines, Bull. 75, p. 254.
Jan. 14, 1911	Modoc–Butte, High Ore	Butte, Mont	2	Candle on timbers	Bureau of Mines, Bull. 75, p. 255.
Feb. 23, 1911	Belmont	Tonopah, Nev	17	Candle on pile of timber	Bureau of Mines, Bull. 75, p. 255; Eng. and Min. Jour., vol. 91, p. 758.

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May 5, 1911	Hartford-Cambria No. 2	Negaunee, Mich	7	Candle on mine timbers	Eng. and Min. Jour., vol. 91, p. 1101.
Aug. 23, 1911	Giroux	Kimberly, Nev	7	Unknown	Eng. and Min. Jour., vol. 92, p. 469; Bureau of Mines, Bull. 75, p. 255.
Oct. 22, 1911	Kingdon	Globe, Ariz		Shaft fire	Do.
Oct. 7, 1912	Bunker Hill & Sullivan	Kellogg, Idaho	1	Unknown	Do.
Dec. —, 1912	Stewart	Butte, Mont		Candles on timber	
Feb. —, 1913	West Colusa	do		do	Min. and Sci. Press, vol. 106, pp. 325, 353.
June —, 1913	Mountain View	do		Spontaneous	
—— —, 1913	United Verde	Jerome, Ariz		Oxidation of sulphide ores	Eng. and Min. Jour., Vol. 96, pp. 344, 345; also Min. and Sci. Press, vol. 114, p. 78.
Jan. 12, 1914	Negaunee	Negaunee, Mich	2	Unknown	Eng. and Min. Jour., vol. 99, p. 86.
Jan. 21, 1914	Boston	Bingham, Utah	5	do	Do.
Aug. 12, 1914	Big Ben	Kern County, Calif	3	do	Eng. and Min. Jour., vol. 99, p. 87.
Feb. 16, 1916	Pennsylvania	Butte, Mont	21	Doubtful	Eng. and Min. Jour., vol. 102, p. 487; Min. and Sci. Press, vol. 114, p. 209.
Apr. 23, 1917	Modoc-High Ore	do		Broken electric power cable	Eng. and Min. Jour., vol. 103, p. 810.
May 8, 1917	Minnie Healey-Leonard	do		Revival of 10-year-old fire	Eng. and Min. Jour., vol. 103, p. 477.
June 8, 1917	Granite Mountain	do	161	Ignition of insulation by carbide lamp	Min. and Sci. Press, vol. 114, p. 862.
Sept. 25, 1919	Homestake	Lead, S. Dak		Presumably ignition old mine timbers by blast.	

ACCIDENTS AT METALLURGICAL PLANTS DURING 1918.[a]

Table 27 shows the number of men employed, number killed and injured at ore-dressing plants, smelting plants, and auxiliary works, by States, for the calendar year 1917.

TABLE 27.—*Labor and accident statistics of metallurgical works for the year ended Dec. 31, 1918.*

State.	Ore-dressing plants.[b]			Smelting plants.[c]			Auxiliary works.[d]		
	Men employed.	Killed.	Injured.	Men employed.	Killed.	Injured.	Men employed.	Killed.	Injured.
Alabama	315	....	25	2	....	....	86	....	1
Alaska	336	....	54	....	....	....	185	1	22
Arizona	3,319	6	653	4,477	9	1,412	2,380	5	583
Arkansas	74	1	6	465	2	53	....	....	....
California	410	3	105	639	....	289	....	....	....
Colorado	1,885	2	170	2,671	5	269	....	....	....
Georgia	47	....	1	....	....	....	8	....	....
Idaho	452	....	62	220	1	47	287	....	25
Illinois	151	....	26	3,711	3	636	1,449	....	268
Kansas	147	....	31	848	2	125	10	....	....
Maryland	....	....	....	2,628	1	131	30	....	10
Michigan	1,948	2	88	994	....	104	31	....	....
Minnesota	561	....	18	....	....	....	....	....	....
Missouri	1,074	1	249	1,226	....	482	690	....	155
Montana	2,360	4	168	2,452	2	248	2,342	5	186
Nevada	1,450	6	142	1,297	2	117	....	....	....
New Jersey	671	....	60	4,133	4	682	2,203	1	225
New Mexico	773	1	229	40	....	3	941	1	102
New York	435	2	56	251	....	228	500	....	397
North Carolina	46	....	13	....	....	....	8	....	....
Oklahoma	471	1	212	3,064	4	479	520	....	109
Oregon	67	1	2	6	....	....	10	....	1
Pennsylvania	56	....	1	3,803	2	396	1,437	1	103
South Dakota	304	....	32	....	....	....	236	1	26
Tennessee	266	1	17	276	....	117	874	1	177
Texas	72	....	2	1,116	1	178	565	....	49
Utah	1,942	2	525	3,173	4	383	1,885	....	169
Vermont	193	....	22	....	....	....	8	....	....
Virginia	550	1	30	194	....	33	166	....	9
Washington	147	....	26	904	....	60	408	....	45
West Virginia	....	....	....	712	....	107	394	....	91
Wisconsin	195	1	55	108	....	28	59	....	7
Other States	273	....	62	489	....	136	332	1	48
Total, 1918	**20,990**	**35**	**3,142**	**39,899**	**42**	**6,743**	**18,044**	**17**	**2,808**
Total 300-day workers	21,659	....	....	45,914	....	....	20,329	....	....
Fatality and injury rates	....	1.62	145.67	....	.91	148.41	....	.84	140.83

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[a] Fay, A. H. Accidents at metallurgical plants, 1918: Tech. Paper 256, Bureau of mines, 1919, 23 pp.
[b] Stamp mills, sampling works, slime plants, lixiviation, leaching, cyanide and flotation mills.
[c] Blast, reverberatory, and roasting furnaces; converters, casting department, and refineries.
[d] Yards, shops, construction, etc.

Table 28.—***ALL MINES 1917:*** *Men employed, number killed, and days worked, by States, during the year ended Dec. 31, 1917.*

State.	Number of employees.			Number killed.		
	Underground.	On the surface.	**Total.**	Underground.[a]	On the surface.	**Total.**
Alabama	5,745	3,343	**9,088**	28	4	**32**
Alaska	4,800	2,776	**7,576**	21	9	**30**
Arizona	16,204	6,288	**22,492**	76	4	80
Arkansas	325	1,248	**1,573**			
California	6,100	4,023	**10,123**	37	7	**44**
Colorado	6,793	756	**7,549**	44	3	**47**
Connecticut	59	56	**115**			
Florida	50	2,451	**2,501**		7	**7**
Georgia	311	604	**915**	2	2	**4**
Idaho	4,328	1,802	**6,130**	19	5	**24**
Illinois	420	257	**677**	3		**3**
Iowa	252	43	**295**			
Kansas	613	288	**901**	3	1	**4**
Kentucky	303	402	**705**			
Maine	35	78	**113**			
Maryland	30	99	**129**			
Massachusetts	39	12	**51**			
Michigan	21,854	10,669	**32,523**	97	12	**109**
Minnesota	9,489	12,331	**21,820**	31	32	**63**
Missouri	9,367	2,639	**12,006**	34	2	**36**
Montana	14,420	1,844	**16,264**	210	4	[a]214
Nevada	4,530	2,325	**6,855**	23	8	**31**
New Hampshire	25	56	**81**			
New Jersey	1,456	736	**2,192**	7	2	**9**
New Mexico	2,419	2,555	**4,974**	9	4	**13**
New York	2,554	1,351	3,905	12	1	**13**
North Carolina	253	714	967	1		**1**
Ohio	215	6	221			
Oklahoma	2,179	715	2,894	18		**18**
Oregon	643	543	1,186	1		**1**
Pennsylvania	40	474	514			
South Carolina	60	173	233			
South Dakota	1,338	822	2,160	7		**7**
Tennessee	1,591	1,944	3,535	8	3	**11**
Texas	369	249	618			
Utah	5,079	2,854	7,933	22	4	**26**
Vermont	98	55	153			
Virginia	990	1,680	2,670	4	4	8
Washington	647	451	1,098	1	3	4
Wisconsin	2,646	1,143	3,789	9	3	12
Wyoming	180	346	526		1	1
Other States	28	501	529			
Total, 1917	128,877	71,702	200,579	727	125	852

[a] See footnote, Table 1.

TABLE 29.—***ALL MINES:*** *Number of active operators by States, 1911 to 1918.*

State.	1911	1912	1913	1814	1915	1916	1917	1918
Alabama	25	20	24	21	18	22	42	38
Alaska	(a)	[b]30	350	350	367	428	362	270
Arizona	352	479	426	346	317	445	450	321
Arkansas	20	11	8	(c)	14	23	38	21
California	855	1,048	1,054	854	704	840	628	389
Colorado	660	624	1,013	412	384	738	407	450
Connecticut	6	5	5	6	5	3	3	3
Florida	21	24	27	18	13	14	15	14
Georgia	33	29	21	18	18	26	29	20
Idaho	513	639	588	526	442	510	414	282
Illinois	15	8	12	8	5	7	11	8
Iowa	14	12	9	7	6	9	8	6
Kansas	45	50	40	24	25	29	28	26
Kentucky	20	14	15	11	6	8	25	15
Maine	4	4	5	4	3	4	5	(c)
Maryland	20	19	16	12	9	10	12	8
Massachusetts	7	4	3	3	4	3	3	3
Michigan	74	79	84	80	80	76	86	70
Minnesota	40	43	54	57	70	63	66	62
Missouri	337	318	283	172	151	159	210	101
Montana	332	405	384	302	283	328	284	216
Nevada	472	554	566	450	401	406	405	414
New Hampshire	5	7	7	5	4	3	6	9
New Jersey	14	10	7	7	8	7	6	6
New Mexico	134	163	139	118	119	123	135	92
New York	32	39	36	34	27	37	33	31
North Carolina	57	70	60	30	23	23	23	25
Ohio	7	7	7	4	6	5	4	(c)
Oklahoma	32	30	36	23	32	37	42	51
Oregon	210	260	261	225	182	210	183	140
Pennsylvania	38	38	34	22	19	21	19	18
South Carolina	5	7	6	5	3	3	3	(c)
South Dakota	58	63	74	60	59	65	64	48
Tennessee	40	36	36	27	25	25	32	37
Texas	9	8	8	7	6	11	12	14
Utah	295	336	285	234	188	223	233	178
Vermont	10	11	10	5	6	7	7	7
Virginia	49	33	28	25	33	27	36	40
Washington	238	277	231	188	176	176	168	112
Wisconsin	78	77	61	38	33	51	53	50
Wyoming	53	74	71	60	45	49	42	31
Other States	3	2	3	7	3	4	5	10
Total	**5,232**	**5,967**	**6,387**	**4,805**	**4,322**	**5,258**	**4,637**	**3,636**

[a] Not reported.

[b] Placer mines not included.

[c] Not segregated.

TABLE 30.—***ALL MINES:*** *Actual number of men employed, by States, 1911 to 1918.*

State.	1911	1912	1913	1914	1915	1916	1917	1918
Alabama	4,101	4,827	5,212	5,225	4,956	7,360	9,088	7,975
Alaska	(a)	[b] 1,914	8,000	8,000	8,125	8,193	7,576	5,510
Arizona	12,768	15,591	16,489	14,011	14,057	21,421	22,492	19,391
Arkansas	584	404	337	(c)	685	1,012	1,573	795
California	10,877	10,312	11,476	9,761	10,414	13,295	10,123	9,750
Colorado	10,404	8,892	15,949	9,228	6,369	10,120	7,549	8,423
Connecticut	164	259	255	216	108	110	115	79
Florida	4,305	4,461	4,538	2,885	1,737	1,974	2,501	2,582
Georgia	1,001	515	444	305	295	604	915	745
Idaho	4,801	6,229	5,769	5,249	5,190	6,083	6,130	4,464
Illinois	848	440	511	490	384	509	677	665
Iowa	244	200	231	281	214	271	295	362
Kansas	729	831	608	315	435	615	901	1,112
Kentucky	461	460	516	221	174	278	705	504
Maine	81	72	121	128	105	60	113	(c)
Maryland	231	329	359	69	223	143	129	70
Massachusetts	118	58	48	31	86	34	51	33
Michigan	31,584	29,469	28,174	27,272	27,512	34,061	32,523	33,236
Minnesota	16,548	16,559	19,546	17,694	14,572	19,152	21,820	20,378
Missouri	9,901	11,403	9,747	8,480	9,570	14,334	12,006	6,063
Montana	13,346	13,340	19,500	13,046	13,846	19,491	16,264	17,858
Nevada	6,210	7,547	7,316	6,821	5,713	7,953	6,855	5,689
New Hampshire	100	90	83	38	41	34	81	92
New Jersey	1,739	1,633	1,433	1,362	1,745	2,031	2,192	2,201
New Mexico	2,450	2,502	3,766	2,424	2,732	4,182	4,974	3,994
New York	3,202	2,710	3,345	3,002	2,558	3,662	3,905	3,648
North Carolina	997	1,068	1,167	994	627	695	967	569
Ohio	362	310	305	192	265	262	221	(c)
Oklahoma	418	541	641	596	855	1,593	2,894	3.545
Oregon	1,394	1,052	1,349	1,279	1,070	1,308	1,186	1,287
Pennsylvania	862	762	656	425	384	460	514	336
South Carolina	984	1,041	444	416	487	153	233	(c)
South Dakota	2,519	1,963	2,091	1,841	1,796	2,491	2,160	1,515
Tennessee	4,454	3,480	3,151	3,253	2,821	3,836	3,535	3,601
Texas	248	386	350	346	294	943	618	1,414
Utah	7,710	8,458	7,872	5,837	5,449	7,384	7,933	6,901
Vermont	180	181	143	112	98	155	153	140
Virginia	3,971	2,516	2,596	1,877	1,976	2,919	2,670	2,150
Washington	1,569	1,307	1,302	865	715	1,239	1,098	871
Wisconsin	2,844	3,834	4,330	2,576	2,651	3,574	3,789	3,058
Wyoming	612	662	616	480	386	501	526	403
Other States	58	591	490	472	398	190	529	1,197
Total	**165,979**	**169,199**	**191,276**	**158,115**	**152,118**	**204,685**	**200,579**	**182,606**

[a] Not reported.

[b] Placer mines not included.

[c] Not segregated.

TABLE 31.—***ALL MINES:*** *Number of 300-day workers employed, by States, 1911 to 1918.*

[Derived from Table 32.]

State.	1911	1912	1913	1914	1915	1916	1917	1918
Alabama	4,503	4,340	4,951	4,771	4,438	7,208	8,464	7,993
Alaska	(a)	b 2,176	6,939	6,842	5,713	5,818	5,567	4,589
Arizona	12,288	15,673	17,314	14,537	13,839	21,664	22,464	21,555
Arkansas	487	346	290	(c)	544	787	1,359	582
California	10,206	9,486	10,386	9,091	10,545	12,561	11,390	9,750
Colorado	10,501	8,854	15,892	9,228	6,435	10,787	7,550	8,423
Connecticut	152	256	247	130	88	94	115	77
Florida	4,278	4,402	3,834	2,264	1,473	1,662	2,460	2,739
Georgia	804	374	340	161	209	394	805	601
Idaho	4,146	5,641	5,448	4,556	4,623	5,284	5,541	4,137
Illinois	780	442	452	348	383	418	608	579
Iowa	235	163	203	210	157	233	244	253
Kansas	537	647	490	225	249	524	690	804
Kentucky	405	286	315	102	140	122	478	441
Maine	63	54	107	101	66	56	112	(c)
Maryland	178	297	347	46	158	70	118	53
Massachusetts	90	50	47	28	68	28	49	31
Michigan	31,285	29,822	26,262	24,909	26,474	34,031	32,036	32,914
Minnesota	13,919	15,868	19,922	14,635	13,264	16,233	20,706	19,704
Missouri	8,361	10,156	8,182	7,268	8,354	13,067	10,107	5,250
Montana	13,385	13,263	20,591	11,289	13,679	19,310	16,218	18,265
Nevada	6,097	7,422	7,476	6,768	5,753	7,271	6,863	6,827
New Hampshire	85	56	55	29	34	31	71	63
New Jersey	1,502	1,537	1,480	1,347	1,798	2,079	2,065	2,200
New Mexico	2,525	2,232	3,047	2,143	2,504	3,938	4,973	3,886
New York	3,101	2,633	3,102	2,779	2,301	3,496	4,189	3,481
North Carolina	567	717	761	730	495	558	693	449
Ohio	326	255	286	169	222	232	133	(c)
Oklahoma	275	377	494	505	683	1,163	2,102	2,816
Oregon	1,107	663	874	695	745	894	817	843
Pennsylvania	714	638	572	349	318	387	455	291
South Carolina	933	955	323	257	390	140	168	(c)
South Dakota	1,934	1,965	2,401	1,942	1,945	2,616	2,361	1,664
Tennessee	3,854	2,938	2,764	2,559	2,363	3,306	3,204	3,175
Texas	246	356	342	347	300	1,105	635	1,630
Utah	8,262	8,517	8,470	6,231	6,086	7,817	8,620	7,825
Vermont	142	151	111	99	92	142	128	139
Virginia	3,522	2,209	2,369	1,661	1,450	2,512	2,395	1,896
Washington	1,051	656	869	304	377	694	745	613
Wisconsin	2,455	3,465	4,152	2,145	2,476	3,126	3,336	2,794
Wyoming	542	520	451	327	296	388	436	340
Other States	56	714	585	372	470	209	615	1,333
Total	**156,083**	**161,662**	**183,593**	**142,619**	**141,997**	**192,455**	**192,085**	**181,006**

a Not reported.
b Placer mines not included.
c Not segregated.

TABLE 32.—***ALL MINES:*** *Days of labor performed, by States, 1911 to 1918.*

State.	1911	1912	1913	1914	1915	1916	1917	1918
Alabama	1,350,944	1,302,041	1,485,189	1,431,218	1,331,512	2,162,392	2,539,347	2,397,912
Alaska	(a)	[b]652,873	2,096,782	2,052,450	1,713,859	1,745,476	1,670,175	1,376,571
Arizona	3,686,479	4,701,702	5,194,231	4,361,024	4,151,671	6,499,137	6,739,067	6,466,550
Arkansas	146,246	103,735	87,046	(c)	163,165	236,074	407,830	174,515
California	3,061,843	2,845,815	3,115,698	2,727,281	3,163,407	3,768,322	3,417,101	2,925,110
Colorado	3,150,356	2,656,168	4,767,651	2,768,400	1,930,586	3,236,196	2,264,883	2,526,935
Connecticut	45,644	76,930	74,004	38,975	26,544	28,229	34,456	23,030
Florida	1,283,315	1,320,480	1,150,343	679,182	441,908	498,605	737,887	821,690
Georgia	241,242	112,081	101,867	48,386	62,758	118,198	241,366	180,233
Idaho	1,243,744	1,692,351	1,634,392	1,366,877	1,386,965	1,585,121	1,662,271	1,241,089
Illinois	233,963	132,658	135,732	104,462	114,881	125,479	182,389	173,604
Iowa	70,550	48,753	61,042	62,883	47,004	69,959	73,304	75,997
Kansas	161,213	194,238	147,034	67,386	74,704	157,194	206,850	241,166
Kentucky	121,530	85,873	94,493	30,487	42,175	36,630	143,401	132,422
Maine	18,920	16,230	32,178	30,389	19,835	16,948	33,450	(c)
Maryland	53,292	89,136	104,195	13,850	47,303	20,909	35,412	15,780
Massachusetts	26,994	15,100	14,028	8,463	20,350	8,410	14,803	9,340
Michigan	9,385,524	8,946,517	7,878,782	7,472,852	7,942,080	10,209,502	9,610,957	9,874,061
Minnesota	4,175,782	4,760,330	5,976,512	4,399,549	3,979,111	4,870,007	6,211,912	5,911,146
Missouri	2,508,345	3,046,934	2,454,713	2,180,531	2,506,376	3,920,002	3,032,204	1,575,149
Montana	4,015,502	3,979,041	6,177,500	3,386,894	4,103,700	5,793,114	4,865,567	5,479,838
Nevada	1,829,108	2,226,733	2,242,654	2,030,527	1,726,012	2,181,188	2,059,054	2,047,980
New Hampshire	25,524	16,804	16,010	8,574	10,125	9,288	21,205	18,936
New Jersey	477,583	460,997	443,973	404,054	539,417	623,793	619,640	659,978
New Mexico	757,495	669,707	914,038	643,005	751,056	1,181,330	1,491,783	1,165,899
New York	930,133	789,982	930,515	833,826	690,256	1,048,875	1,256,601	1,044,184
North Carolina	169,983	215,194	228,245	218,973	148,614	167,282	207,936	134,698
Ohio	97,720	76,397	85,807	50,604	66,613	69,570	40,040	(c)
Oklahoma	82,620	113,041	148,132	151,616	204,973	348,759	630,504	844,840
Oregon	332,049	198,906	262,126	208,531	223,416	268,056	245,038	252,942
Pennsylvania	214,076	191,254	171,463	104,553	95,549	116,162	136,590	87,262
South Carolina	294,900	286,514	96,985	77,088	116,933	41,975	50,400	(c)
South Dakota	595,262	589,427	720,169	582,731	583,497	784,715	708,364	499,300
Tennessee	1,156,005	881,261	829,277	767,793	708,870	991,838	961,148	952,359
Texas	73,870	106,940	102,695	104,000	89,988	331,399	190,495	489,154
Utah	2,478,517	2,555,037	2,541,022	1,869,201	1,825,854	2,345,007	2,586,036	2,347,633
Vermont	42,639	45,325	33,236	29,698	27,492	42,557	38,487	41,766
Virginia	1,056,461	689,800	710,805	498,414	434,968	753,543	718,380	568,689
Washington	315,342	196,807	260,828	118,113	113,009	208,164	223,421	183,963
Wisconsin	736,463	1,039,400	1,245,478	643,464	742,653	937,859	1,000,661	838,294
Wyoming	162,695	155,903	135,280	98,034	88,849	116,261	130,770	101,943
Other States	16,700	214,065	175,705	111,502	140,977	62,900	184,626	399,790
Total	**46,826,573**	**48,498,510**	**55,077,855**	**42,785,840**	**42,599,015**	**57,736,425**	**57,625,811**	**54,301,748**

[a] Not reported. [b] Placer mines not included. [c] Not segregated.

TABLE 33.—***ALL MINES:*** *Average number of days mines were operated, by States, 1911 to 1918.*

State.	1911	1912	1913	1914	1915	1916	1917	1918
Alabama	329	270	285	274	269	294	279	301
Alaska	(a)	[b] 341	263	257	211	213	220	250
Arizona	288	302	315	311	295	303	300	333
Arkansas	250	257	258	(c)	238	233	259	220
California	282	276	271	279	304	283	338	300
Colorado	303	299	299	300	303	320	300	300
Connecticut	272	297	290	180	246	257	300	292
Florida	298	296	253	235	254	253	295	318
Georgia	241	218	229	159	213	196	264	242
Idaho	259	272	283	260	267	261	271	278
Illinois	276	301	266	213	299	247	269	261
Iowa	289	244	264	224	220	258	248	210
Kansas	221	234	242	214	172	256	230	217
Kentucky	264	187	183	138	242	132	203	263
Maine	234	225	266	237	189	282	296	(c)
Maryland	231	271	290	201	212	146	275	225
Massachusetts	229	260	292	273	237	247	290	283
Michigan	297	304	280	274	289	300	296	297
Minnesota	252	287	306	249	273	254	285	290
Missouri	253	267	252	257	262	273	253	260
Montana	301	298	317	260	296	297	299	307
Nevada	295	295	307	298	302	274	300	360
New Hampshire	255	187	193	226	247	273	262	206
New Jersey	275	282	310	297	309	307	283	300
New Mexico	309	268	243	265	275	282	300	292
New York	290	292	278	278	270	286	322	286
North Carolina	170	201	186	220	237	241	215	237
Ohio	270	246	281	264	251	266	181	(c)
Oklahoma	198	209	231	254	240	219	218	238
Oregon	238	189	194	163	209	205	207	197
Pennsylvania	248	251	261	246	249	253	266	260
South Carolina	300	275	318	185	240	274	216	(c)
South Dakota	236	300	344	317	325	315	328	330
Tennessee	260	253	263	236	250	259	272	264
Texas	298	277	291	301	306	351	308	346
Utah	321	302	323	320	335	318	326	340
Vermont	237	250	232	265	281	275	252	298
Virginia	266	274	274	266	220	258	269	265
Washington	201	151	200	137	158	168	203	211
Wisconsin	259	271	288	250	280	262	264	274
Wyoming	266	236	220	204	230	232	249	253
Other States	288	362	359	236	354	331	349	334
Total	282	287	288	271	280	282	287	297

[a] Not reported.

[b] Placer mines not included.

[c] Not segregated.

TABLE 34.—***ALL MINES:*** *Fatalities, by States, 1911 to 1918.*

State.	1911	1912	1913	1914	1915	1916	1917	1918
Alabama	10	33	22	25	12	27	32	25
Alaska	(a)	[b] 21	25	19	22	29	30	8
Arizona	70	67	86	63	41	68	80	86
Arkansas	2	1	....	(c)	1	1	....	1
California	38	40	52	41	49	42	44	54
Colorado	43	48	44	47	49	63	47	39
Connecticut	....	....	....	....	....	....	....	....
Florida	9	6	14	10	3	4	7	3
Georgia	2	....	1	1	1	4	4	1
Idaho	23	29	24	25	25	15	24	17
Illinois	1	1	1	....	3	4	3	3
Iowa	1	....	....	....	2	1	....	....
Kansas	2	2	4	1	2	3	4	6
Kentucky	3	1	....	2	....	....	....	2
Maine	....	....	....	....	....	....	....	....
Maryland	....	....	....	....	....	....	....	....
Massachusetts	....	....	....	....	....	....	....	....
Michigan	134	96	82	99	99	128	109	109
Minnesota	76	50	63	43	36	42	63	64
Missouri	38	36	34	25	44	35	36	12
Montana	62	50	64	39	62	75	214	64
Nevada	50	34	25	22	18	30	31	33
New Hampshire	....	1	....	....	....	....	....	1
New Jersey	23	13	8	4	9	8	9	10
New Mexico	11	13	28	5	4	21	13	15
New York	10	17	14	11	8	16	13	14
North Carolina	4	1	4	8	....	....	1	2
Ohio	....	1	....	....	2	1	....	....
Oklahoma	....	2	1	3	4	5	18	13
Oregon	2	1	3	1	2	1	1	4
Pennsylvania	1	2	....	....	1	4	....	1
South Carolina	....	....	....	....	....	....	....	....
South Dakota	8	6	8	4	6	6	7	1
Tennessee	10	12	10	18	8	11	11	13
Texas	....	....	1	....	1	2	....	4
Utah	49	41	36	29	23	24	26	28
Vermont	....	2	1	....	1	2	....	....
Virginia	6	4	12	2	1	3	8	5
Washington	3	4	4	....	4	3	4	....
Wisconsin	3	22	11	11	8	17	12	8
Wyoming	....	4	....	....	2	1	1	....
Other States	1	....	1	1	....	1	....	....
Total	695	661	683	559	553	697	852	**646**

(a) Not reported. [b] Placer mines not included. [c] Not segregated.

TABLE 35.—*ALL MINES: Injuries, by States, 1911 to 1918.*

State.	1911	1912	1913	1914	1915	1916	1917	1918
Alabama	1,437	2,048	1,896	1,462	1,501	2,013	2,247	1,536
Alaska	(a)	[b] 89	29	260	512	657	543	206
Arizona	2,650	4,219	5,076	5,374	5,014	7,340	7,860	10,460
Arkansas	11	13	11	(c)	29	130	75	36
California	524	865	842	1,800	2,928	3,751	2,888	3,160
Colorado	738	825	254	872	1,219	1,457	1,074	849
Connecticut	2	....	4	5	2	2	13	5
Florida	158	231	261	191	176	164	262	211
Georgia	22	29	18	20	27	44	66	17
Idaho	618	720	749	635	971	915	1,044	868
Illinois	27	39	18	58	51	189	151	72
Iowa	22	17	46	39	67	53	67	47
Kansas	78	30	33	19	53	105	81	142
Kentucky	18	9	14	5	9	38	41	47
Maine	....	....	1	....	3	4	1	(c)
Maryland	10	1	3	4	4	11	2	....
Massachusetts	....	1	3	6	11	3	....	1
Michigan	7,352	8,064	6,521	6,311	7,821	9,310	8,625	6,543
Minnesota	6,190	4,424	6,360	3,427	2,989	3,692	4,473	3,833
Missouri	1,240	1,688	1,110	1,355	2,038	3,005	2,384	1,566
Montana	1,213	2,222	2,936	2,438	3,486	5,344	3,978	4,401
Nevada	373	824	1,093	816	1,014	1,451	1,124	1,191
New Hampshire	1	5	2	1	....	....	4	2
New Jersey	418	575	349	394	341	421	377	325
New Mexico	93	167	295	281	436	717	996	669
New York	357	400	492	490	477	1,311	1,043	827
North Carolina	32	63	38	113	135	115	106	51
Ohio	41	25	31	33	29	34	39	(c)
Oklahoma	7	50	129	85	127	301	923	1,271
Oregon	19	30	28	43	45	84	123	124
Pennsylvania	5	8	8	10	8	42	74	17
South Carolina	1	36	16	13	6	1	8	(c)
South Dakota	704	176	491	569	581	739	730	476
Tennessee	278	390	371	658	614	696	627	436
Texas	....	3	14	20	48	262	83	233
Utah	1,449	1,421	1,855	1,638	1,604	2,262	2,385	2,119
Vermont	1	12	8	11	9	30	49	46
Virginia	127	121	127	132	167	273	262	152
Washington	20	23	41	21	26	48	280	65
Wisconsin	336	619	1,236	487	605	1,108	1,031	721
Wyoming	4	4	7	2	8	39	12	15
Other States	1	248	155	118	104	84	135	175
Total	**26,577**	**30,734**	**32,971**	**30,216**	**35,295**	**48,237**	**46,286**	**42,915**

[a] Not reported. [b] Placer mines not included. [c] Not segregated.

TABLE 36.—***ALL MINES:*** *Number of fatalities per 1,000 300-day workers, by States, 1911 to 1918.*

State.	1911	1912	1913	1914	1915	1916	1917	1918
Alabama	2.22	7.60	4.44	5.24	2.70	3.75	3.78	3.13
Alaska	(a)	[b] 9.65	3.58	2.78	3.85	4.98	5.39	1.74
Arizona	5.70	4.27	4.97	4.33	2.96	3.14	3.56	3.99
Arkansas	4.11	2.89	....	(c)	1.84	1.27	....	1.72
California	3.72	4.22	5.01	4.51	4.65	3.34	3.86	5.54
Colorado	4.09	5.42	2.77	5.09	7.61	5.84	6.23	4.63
Connecticut	....	....	....	....	....	....	....	....
Florida	2.10	1.36	3.65	4.42	2.04	2.41	2.85	1.10
Georgia	2.49	....	2.94	6.21	4.78	10.15	4.97	1.66
Idaho	5.55	5.14	4.41	5.49	5.41	2.84	4.33	4.11
Illinois	1.28	2.26	2.21	....	7.83	9.57	4.93	5.18
Iowa	4.26	....	....	....	12.74	4.29	....	....
Kansas	3.72	3.09	8.16	4.44	8.03	5.73	5.80	7.46
Kentucky	7.41	3.50	....	19.61	....	....	....	4.54
Maine	....	....	....	....	....	....	....	....
Maryland	....	....	....	....	....	....	....	....
Massachusetts	....	....	....	....	....	....	....	....
Michigan	4.28	3.22	3.12	3.97	3.74	3.76	3.40	3.31
Minnesota	5.46	3.15	3.16	2.93	2.71	2.59	3.04	3.25
Missouri	4.54	3.54	4.16	3.44	5.27	2.68	3.56	2.29
Montana	4.63	3.77	3.11	3.45	4.53	3.88	13.20	3.50
Nevada	8.20	4.58	3.34	3.25	3.13	4.13	4.52	4.83
New Hampshire	....	17.86	....	....	....	....	....	15.87
New Jersey	14.45	8.46	5.41	2.97	5.01	3.85	4.36	4.55
New Mexico	4.36	5.82	9.19	2.33	1.60	5.33	2.61	3.86
New York	3.22	6.46	4.51	3.96	3.48	4.58	3.10	4.02
North Carolina	7.05	1.39	5.26	10.96	....	....	1.44	4.45
Ohio	....	3.92	....	....	9.01	4.31	....	....
Oklahoma	....	5.31	2.02	5.94	5.86	4.30	8.56	4.62
Oregon	1.81	1.51	3.43	1.44	2.68	1.12	1.22	4.74
Pennsylvania	1.41	3.13	....	....	3.14	10.34	....	3.44
South Carolina	....	....	....	....	....	....	....	....
South Dakota	4.03	3.05	3.33	2.06	3.08	2.29	2.96	.60
Tennessee	2.59	4.08	3.62	7.03	3.39	3.33	3.43	4.09
Texas	....	....	2.92	....	3.33	1.81	....	2.45
Utah	5.93	4.81	4.25	4.65	3.78	3.07	3.02	3.58
Vermont	....	13.25	9.01	....	10.87	14.08	....	....
Virginia	1.70	1.74	5.07	1.20	.69	1.19	3.34	2.64
Washington	2.85	6.10	4.60	....	10.61	4.32	5.37	....
Wisconsin	1.22	6.35	2.65	5.13	3.23	5.44	3.60	2.86
Wyoming	....	7.69	....	....	6.76	2.58	2.29	....
Other States	17.86	....	1.71	2.69	....	4.78	....	....
Total	**4.45**	**4.09**	**3.72**	**3.92**	**3.89**	**3.62**	**4.44**	**3.57**

[a] Not reported. [b] Placer mines not included. [c] Not segregated.

TABLE 37.—***ALL MINES:*** *Injuries per 1,000 300-day workers employed, by States, 1911 to 1918.*

State.	1911	1912	1913	1914	1915	1916	1917	1918
Alabama	319.12	471.89	382.95	306.43	338.22	279.27	265.48	192.17
Alaska	(*a*)	[b] 40.90	4.15	38.00	89.62	112.93	97.54	44.89
Arizona	215.66	269.19	293.17	369.68	361.59	338.81	349.89	485.27
Arkansas	22.59	37.57	37.93	(*c*)	53.31	165.18	55.19	61.86
California	51.34	91.19	81.07	198.00	277.69	298.62	253.56	324.10
Colorado	70.28	93.18	15.98	94.50	189.43	135.07	142.25	100.80
Connecticut	13.16	....	16.19	38.46	22.73	21.28	113.04	64.94
Florida	36.93	52.48	68.08	84.36	119.48	98.68	106.50	77.04
Georgia	27.36	77.54	52.94	124.22	129.19	111.68	81.99	28.29
Idaho	149.06	127.64	137.48	139.38	210.04	173.16	188.41	209.81
Illinois	34.62	88.24	37.82	166.67	133.16	452.15	248.36	124.35
Iowa	93.62	104.29	226.60	185.71	426.75	227.47	274.59	185.77
Kansas	145.25	46.37	67.35	84.44	212.85	200.38	117.39	176.62
Kentucky	44.44	31.47	44.44	49.02	63.83	311.48	85.77	106.58
Maine	....	....	9.35	....	45.45	71.43	8.93	(*c*)
Maryland	56.18	3.37	8.65	86.96	25.32	157.14	16.95	....
Massachusetts	....	20.00	63.83	214.29	161.76	107.14	....	32.26
Michigan	235.00	270.40	248.30	253.36	295.43	273.57	269.23	198.79
Minnesota	444.72	278.80	319.25	233.69	225.35	227.44	216.02	194.53
Missouri	148.31	166.21	135.66	186.43	243.93	229.97	235.88	298.29
Montana	90.62	167.53	142.59	215.96	254.84	276.75	245.28	240.94
Nevada	61.18	111.02	146.20	120.57	176.26	199.56	163.78	174.45
New Hampshire	11.76	89.29	36.36	34.48	....	....	56.34	31.75
New Jersey	262.56	374.11	235.81	292.50	189.66	202.50	182.57	147.73
New Mexico	36.83	74.82	96.82	131.13	174.12	182.07	200.28	172.16
New York	115.12	151.92	158.61	176.32	207.30	375.00	248.99	237.58
North Carolina	56.44	87.87	49.93	154.79	272.73	206.09	152.96	113.59
Ohio	125.77	98.04	108.39	195.27	130.63	146.55	293.23	(*c*)
Oklahoma	25.45	132.63	261.13	168.32	185.94	258.81	439.11	451.35
Oregon	17.16	45.25	32.04	61.87	60.40	93.96	150.55	147.09
Pennsylvania	7.00	12.54	13.99	28.65	25.16	108.53	162.64	58.42
South Carolina	1.02	37.70	49.54	50.58	15.38	71.43	47.62	(*c*)
South Dakota	354.84	89.57	204.50	293.00	298.71	282.49	309.19	286.06
Tennessee	72.13	132.74	134.23	257.13	259.84	210.53	195.69	137.32
Texas	....	8.43	40.94	57.64	160.00	237.10	130.71	142.86
Utah	175.38	166.84	219.01	262.88	263.56	289.37	276.68	270.80
Vermont	7.04	79.47	72.07	111.11	97.83	211.27	382.81	330.94
Virginia	36.06	52.63	53.61	79.47	115.17	108.68	109.39	80.17
Washington	19.03	35.06	47.18	53.30	68.97	69.16	375.84	106.04
Wisconsin	136.86	178.64	297.69	227.04	244.35	351.89	309.05	258.05
Wyoming	7.38	7.69	15.52	6.12	27.03	100.52	27.52	44.12
Other States	17.86	347.34	264.96	317.20	221.28	401.91	219.51	131.28
Total	**170.27**	**190.11**	**179.59**	**211.87**	**248.56**	**250.64**	**240.97**	**237.09**

[a] Not reported. [b] Placer mines not included. [c] Not segregated.

SUBCLASSIFICATION OF PRINCIPAL CAUSES OF ACCIDENTS.

Anticipating the need for more details as to mine accidents with regard to some of the more important causes, such as "handling of rock or ore," "explosives," "haulage," "electricity," etc., the Bureau of Mines in 1915 prepared a record form showing the classification of causes as indicated in Tables 39 and 40. These forms were distributed to about 700 mining companies, which were informed that additional copies would be furnished on the condition that a summary report be rendered to the bureau at the close of the year. About 170 companies took advantage of this offer, with the result that the bureau obtained returns from 169 operators in 1916, 153 in 1917, and 135 in 1918 who had kept records of accidents and classified them in such a way as to show more details. The tabulation of these returns is presented in Tables 38, 39, and 40, which show all of the available data concerning accidents at these mines.

Under "explosives" there are 11 subdivisions, whereas in the bureau's earlier reports explosives accidents were reported as a single item. In regard to these subdivisions it will be noted that 25 per cent of all the fatalities due to explosives happened as a result of drilling into old holes, 19 per cent to premature shots, 5 per cent to striking of explosives in loose rock or ore, and 4 per cent to unguarded shots.

Of underground haulage accidents 18 per cent are chargeable to hand and animal haulage and 81 per cent to mechanical haulage. In the matter of nonfatal injuries the underground haulage by hand and animal power claimed 58 per cent and mechanical transportation 42 per cent. Nonfatal injuries at open pit mines and at surface yards bear about the same ratio.

Under "other causes," underground, "falling objects other than 1 and 2" are responsible for 26 per cent of the nonfatal injuries and 64 per cent of the fatalities which had hitherto been classified as miscellaneous accidents.

Under "cage, skip, or bucket" (group 20) there are further subdivisions which show that "runaway skip" resulted in 8 per cent; "riding with rock or ore," 10 per cent; "riding with timber or tools," 35 per cent; and "struck by cage, skip, or bucket," 48 per cent of the fatalities, and a similar ratio for the nonfatal injuries. These various subdivisions will give the safety engineer a better clue as to the immediate cause of some of the accidents and indicate where he should seek to improve conditions.

The last columns of Tables 39 and 40 show, respectively, the total number of fatalities and injuries at metal mines by causes for the years 1911 to 1918, inclusive. The figures shown in *italics* are calculated on the basis of the percentage in the preceding column, thus showing approximately the number of fatalities or injuries in each group distributed on the basis of the selected returns.

In Table 38 is given the summary information for the years 1916 to 1918 showing the total of killed, injured, number employed, number of 300-day workers, and days of labor at the groups of mines represented in the reports tabulated in Tables 39 and 40. It will be noted that the average days' active for this group of mines for the three-year period reported was 311, as compared with an average of 285 for the United States for the eight-year period. The fatality rate is 3.38 per 1,000 300-day workers as compared with 3.96 for the United States as a unit. The nonfatal injury rate is 317.94[a] per 1,000 300-day workers as compared with 216.97 for the United States. This difference, however, is not due to the hazard being greater at this group of mines than for the average for the United States, but to the fact that these returns were selected as representative of complete labor and accident data, whereas the total for the United States includes many returns that are not as complete as they should be.

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[a] Compare this rate with mining methods rate, Table 22, 322.91 for 1918 and 318.52 for 1917.

TABLE 38.—*Summary of accidents and labor statistics compiled from* ***SELECTED*** *representative returns.*

	1916	1917	1918	Total.	Total and average, 1911–1918.
Active operators	169	153	135	457	[a] 40,244
Average days active:					
Underground	312	308	317	312	287
Open pit	296	300	322	306	([b])
Surface	312	296	320	309	[c] 281
Total	311	305	318	311	285
Men employed (actual number):					
Underground	45,370	44,286	39,620	129,276	913,085
Open pit	3,578	5,150	4,867	13,595	([b])
Surface	14,356	12,559	11,540	38,455	[c] 511,472
Total	63,304	61,995	56,027	181,326	1,424,557
Men employed (300-day workers):					
Underground	47,220	45,438	41,921	134,579	872,174
Open pit	3,526	5,142	5,221	13,889	([b])
Surface	14,927	12,380	12,292	39,599	[c] 479,332
Total	65,673	62,960	59,434	188,067	1,351,506
Days of labor:					
Underground	14,166,237	13,631,436	12,576,294	40,373,967	261,652,078
Open pit	1,057,694	1,542,720	1,566,286	4,166,700	([b])
Surface	4,477,971	3,713,992	3,687,578	11,879,541	[c] 143,799,699
Total	19,701,902	18,888,148	17,830,158	56,420,208	405,451,777
Killed:					
Underground	179	194	158	531	4,343
Open pit	11	17	25	53	547
Surface	23	13	16	52	456
Total	213	224	199	636	5,346
Injured:					
Underground	18,041	15,883	15,644	49,568	232,660
Open pit	642	1,463	1,398	3,503	27,012
Surface	2,413	2,255	2,055	6,723	33,559
Total	21,096	19,601	19,097	59,794	293,231
Killed per 1,000 300-day workers:					
Underground	3.79	4.27	3.77	3.95	4.98
Open pit	3.12	3.31	4.79	3.82	([b])
Surface	1.54	1.05	1.30	1.31	2.10
Total	3.24	3.56	3.35	3.38	3.96
Injured per 1,000 300-day workers:					
Underground	382.06	349.55	373.18	368.32	266.76
Open pit	182.08	284.52	267.76	252.21	([b])
Surface	161.65	182.15	167.18	169.78	126.37
Total	321.23	311.32	321.31	317.94	216.97

[a] Average number operators reporting each year, 5,048.
[b] Included in surface.
[c] Includes open pit.

TABLE 39.—***FATALITIES AT METAL MINES**, with principal causes subdivided.*

(Selected returns.)

	Fatalities.				Group totals, per cent.	Total fatalities, 1911–1918.[a]
	1916	1917	1918	Total.		
UNDERGROUND.						
Number killed by—						
1. Falls of rock or ore from roof or wall	70	69	63	202	......	1,600
2. Handling rock or ore	......	......	......	......	......	67
(*a*) Loading at face	1	......	1	2	33.33	*22*
(*b*) Loading at chute	1	2	1	4	66.67	*45*
(*c*) Sledging	......	......	......	......	......	......
3. Timber or hand tools	2	......	1	3	......	42
4. Explosives	......	......	......	......	......	532
(*a*) Transportation	......	......	......	......	......	......
(*b*) Charging	......	8	1	9	12.33	*66*
(*c*) Suffocation	2	......	......	2	2.74	*14*
(*d*) Drilling into old holes	7	7	3	17	23.28	*124*
(*e*) Striking in loose rock or ore	1	1	2	4	5.48	*29*
(*f*) Thawing	......	1	......	1	1.37	*7*
(*g*) Caps, detonators, etc	......	2	......	2	2.74	*14*
(*h*) Unguarded shots	......	3	......	3	4.11	*22*
(*i*) Returned too soon	3	5	......	8	10.96	*59*
(*j*) Premature shot	3	3	8	14	19.18	*102*
(*k*) Miscellaneous	3	6	4	13	17.81	*95*
5. Haulage	......	......	......	......	......	250
(*a*) Hand and animal	3	5	1	9	18.37	*46*
(*b*) Mechanical	11	8	21	40	81.63	*204*
6. Persons falling down chute, winze, raise, or stope	10	22	3	35	......	369
7. Run of ore from chute or pocket	3	1	2	6	......	73
8. Drilling (by machine or hand drills)	......	1	......	1	......	12
9. Electricity	......	......	......	......	......	112
(*a*) Direct contact with trolley wire	3	4	2	9	75.00	*84*
(*b*) Tool or bar striking trolley wire	......	......	......	......	......	......
(*c*) Contact with motor	......	......	......	......	......	......
(*d*) Others	......	1	2	3	25.00	*28*
10. Machinery other than 5 and 8	1	1	......	2	......	23
11. Mine fires	21	3	3	27	......	243
12. Suffocation from natural gases	......	......	......	......	......	34
13. Inrush of water	......	......	2	2	......	53
14. Nails and splinters	2	......	1	3	......	4
15. Other causes	......	......	......	......	......	114
(*a*) Falling objects, other than 1 and 2	4	4	8	16	64.00	*73*
(*b*) Flying objects, other than 2c	......	......	......	......	......	......
(*c*) Burns	......	......	......	......	......	......
(*d*) Miscellaneous	5	2	2	9	36.00	*41*
Total number killed underground	**156**	**159**	**131**	**446**	**70.13**	**3,528**
SHAFT ACCIDENTS.						
Number killed by—						
16. Falling down shafts	9	13	6	28	......	316
17. Objects falling down shafts	6	5	1	12	......	124
18. Breaking of cables	......	......	2	2	......	21
19. Overwinding	......	3	1	4	......	12
20. Cage, skip, or bucket	......	......	......	......	......	248
(*a*) Runaway	......	2	......	2	7.69	*19*
(*b*) Riding with rock or ore	1	......	1	2	7.69	*19*
(*c*) Riding with timber or tools	3	4	3	10	38.46	*95*
(*d*) Struck by	2	5	5	12	46.16	*115*
21. Other causes	2	3	8	13	......	94
Total number killed by shaft accidents	**23**	**35**	**27**	**85**	**13.36**	**815**

[a] **All figures in italics are calculated on basis of percentage in preceding column.**

TABLE 39.—***FATALITIES AT METAL MINES**, with principal causes subdivided*—Continued.

	Fatalities.				Group totals, per cent.	Total fatalities, 1911–1918.
	1916	1917	1918	Total.		
SURFACE ACCIDENTS.						
(At surface plants and shops.)						
Number killed by—						
22. Haulage						48
(*a*) Hand and animal	1	1	2	4	36.36	*17*
(*b*) Mechanical	3	2	2	7	63.64	*31*
23. Railway cars and locomotives	2	2	1	5		51
24. Run or fall of ore in or from ore bins		1		1		17
25. Falls of persons	4			4		51
26. Nails and splinters						3
27. Hand tools, axes, bars, etc						2
28. Electricity:						40
(*a*) Direct contact with trolley wire	1		1	2	28.57	*11*
(*b*) Tool or bar striking trolley wire						
(*c*) Contact with motor		1	1	2	28.57	*11*
(*d*) Others		1	2	3	42.86	*18*
29. Machinery	4	1	2	7		67
30. Other causes						177
(*a*) Falling objects	3	2	3	8	47.06	*83*
(*b*) Flying objects	1	1	1	3	17.65	*31*
(*c*) Burns		1	1	2	11.76	*21*
(*d*) Miscellaneous	4			4	23.53	*42*
Total number killed by surface accidents	**23**	**13**	**16**	**52**	**8.18**	**456**
OPEN-PIT ACCIDENTS.						
Number killed in pit by—						
31. Falls or slides of rock or ore	1	4	8	13		137
32. Explosives						124
(*a*) Transportation						
(*b*) Charging	2		3	5	27.78	*34*
(*c*) Suffocation						
(*d*) Drilling into old holes	2			2	11.11	*14*
(*e*) Striking in loose rock or ore						
(*f*) Thawing		2		2	11.11	*14*
(*g*) Caps, detonators, etc						
(*h*) Unguarded shots						
(*i*) Returned too soon		1		1	5.56	*7*
(*j*) Premature shot		1	5	6	33.33	*41*
(*k*) Miscellaneous			2	2	11.11	*14*
33. Haulage						150
(*a*) Hand and animal						
(*b*) Mechanical						
(*c*) Railway cars and locomotives	5	9	5	19		
34. Steam shovel						14
35. Falls of persons						22
36. Falls of derricks, booms, etc						8
37. Run or fall of ore in or from ore bins						1
38. Machinery (other than 33 and 34)						30
39. Electricity						17
(*a*) Direct contact with trolley wire						
(*b*) Tool or bar striking trolley wire						
(*c*) Contact with motor						
(*d*) Others			1	1		
40. Hand tools						
41. Other causes						44
(*a*) Falling objects other than 31						
(*b*) Flying objects			1	1	50.00	*22*
(*c*) Burns						
(*d*) Miscellaneous	1			1	50.00	*22*
Total number killed by open-pit accidents.	**11**	**17**	**25**	**53**	**8.33**	**547**
Grand total	213	224	199	636	100.00	5,346

TABLE 40.—***INJURIES AT METAL MINES**, with principal causes subdivided.*

	Nonfatal injuries.				Group totals, per cent.	Total injuries, 1911–1918.[a]
	1916	1917	1918	Total.		
UNDERGROUND.						
Number injured by—						
1. Falls of rock or ore from roof or wall	4,841	3,782	3,858	12,481	....	59,221
2. Handling rock or ore	....	....	....	....	....	29,853
(*a*) Loading at face	968	920	846	2,734	38.79	*11,192*
(*b*) Loading at chute	997	1,096	1,079	3,172	45.00	*12,984*
(*c*) Sledging	502	328	313	1,143	16.21	*4,677*
3. Timber or hand tools	2,280	1,829	1,435	5,544	....	25,620
4. Explosives	....	....	....	....	....	3,696
(*a*) Transportation	4	7	4	15	1.96	*72*
(*b*) Charging	2	20	4	26	3.41	*126*
(*c*) Suffocation	64	33	29	126	16.51	*610*
(*d*) Drilling into old holes	38	6	7	51	6.68	*247*
(*e*) Striking in loose rock or ore	6	3	18	27	3.54	*131*
(*f*) Thawing	....	2	....	2	.26	*10*
(*g*) Caps, detonators, etc	18	22	13	53	6.95	*257*
(*h*) Unguarded shots	19	10	28	57	7.47	*276*
(*i*) Returned too soon	32	25	14	71	9.31	*344*
(*j*) Premature shot	15	18	29	62	8.13	*301*
(*k*) Miscellaneous	113	70	90	273	35.78	*1,322*
5. Haulage	....	....	....	....	....	32,194
(*a*) Hand and animal	1,741	1,337	1,073	4,151	58.17	*18,727*
(*b*) Mechanical	648	1,160	1,177	2,985	41.83	*13,467*
6. Persons falling down chute, winze, raise, or stope	508	465	440	1,413	....	7,610
7. Run of ore from chute or pocket	522	82	377	981	....	6,700
8. Drilling (by machine or hand drills)	914	761	767	2,442	....	14,436
9. Electricity	....	....	....	....	....	544
(*a*) Direct contact with trolley wire	11	13	5	29	20.00	*109*
(*b*) Tool or bar striking trolley wire	7	6	3	16	11.04	*60*
(*c*) Contact with motor	4	4	11	19	13.10	*71*
(*d*) Others	22	18	41	81	55.86	*304*
10. Machinery other than 5 and 8	159	99	119	377	....	3,338
11. Mine fires	2	7	4	13	....	166
12. Suffocation from natural gases	7	24	27	58	....	336
13. Inrush of water	2	2	3	7	....	238
14. Nails and splinters	305	322	396	1,023	....	3,811
15. Other causes	....	....	....	....	....	37,493
(*a*) Falling objects, other than 1 and 2	696	792	899	2,387	26.33	*9,872*
(*b*) Flying objects, other than 2*c*	284	369	321	974	10.74	*4,027*
(*c*) Burns	82	79	58	219	2.41	*903*
(*d*) Miscellaneous	1,811	1,859	1,817	5,487	60.52	*22,691*
Total number injured underground	**17,624**	**15,570**	**15,305**	**48,499**	....	**225,256**
SHAFT ACCIDENTS.						
Number injured by—						
16. Falling down shafts	44	25	25	94	....	696
17. Objects falling down shafts	121	109	101	331	....	2,340
18. Breaking of cables	3	5	11	19	....	76
19. Overwinding	2	2	1	5	....	61
20. Cage, skip, or bucket	....	....	....	....	....	2,105
(*a*) Runaway	3	12	6	21	7.19	*1,009*
(*b*) Riding with rock or ore	6	5	17	28	9.59	*743*
(*c*) Riding with timber or tools	25	24	54	103	35.27	*202*
(*d*) Struck by	54	47	39	140	47.95	*151*
21. Other causes	159	84	85	328	....	2,126
Total number injured by shaft accidents	**417**	**313**	**339**	**1,069**	....	**7,404**

[a] All figures in italics are calculated on basis of percentage in preceding column.

TABLE 40.—***INJURIES AT METAL MINES,*** *with principal causes subdivided*—Continued.

	Nonfatal injuries.				Group totals, per cent.	Total injuries, 1911–1918.
	1916	1917	1918	Total.		
SURFACE ACCIDENTS.						
(At surface plants and shops.)						
Number injured by—						
22. Haulage						**2,271**
(*a*) Hand and animal	137	90	84	311	55.73	*1,266*
(*b*) Mechanical	92	93	62	247	44.27	*1,005*
23. Railway cars and locomotives	55	89	70	214		1,008
24. Run or fall of ore in or from ore bins	38	28	37	103		**825**
25. Falls of persons	230	209	164	603		3,491
26. Nails and splinters	124	103	99	326		1,980
27. Hand tools, axes, bars, etc	265	339	274	878		4,814
28. Electricity						331
(*a*) Direct contact with trolley wire		2	3	5	5.26	*17*
(*b*) Tool or bar striking trolley wire	2	3	3	8	8.42	*28*
(*c*) Contact with motor	4	4	4	12	12.63	*42*
(*d*) Others	12	32	26	70	73.69	*244*
29. Machinery	194	165	161	520		3,876
30. Other causes						14,963
(*a*) Falling objects	214	245	256	715	20.87	*3,123*
(*b*) Flying objects	140	136	165	441	12.87	*1,926*
(*c*) Burns	196	74	61	331	9.66	*1,445*
(*d*) Miscellaneous	710	643	586	1,939	56.60	*8,469*
Total number injured by surface accidents	**2,413**	**2,255**	**2,055**	**6,723**		**33,559**
OPEN-PIT ACCIDENTS.						
Number injured in pit by—						
31. Falls or slides of rock or ore	36	295	248	579		4,617
32. Explosives						983
(*a*) Transportation		2		2	1.89	*19*
(*b*) Charging	1		9	10	9.44	*93*
(*c*) Suffocation						
(*d*) Drilling into old holes	2	2		4	3.77	*37*
(*e*) Striking in loose rock or ore			1	1	.94	*9*
(*f*) Thawing		1		1	.94	*9*
(*g*) Caps, detonators, etc	1		2	3	2.83	*28*
(*h*) Unguarded shots			1	1	.94	*9*
(*i*) Returned too soon		5	1	6	5.66	*56*
(*j*) Premature shot	2	1	20	23	21.70	*213*
(*k*) Miscellaneous	13	22	20	55	51.89	*510*
33. Haulage						3,155
(*a*) Hand and animal	14	26	13	53	13.99	*441*
(*d*) Mechanical	7	15	20	42	11.08	*350*
(*c*) Railway cars and locomotives	71	103	110	284	74.93	*2,364*
34. Steam shovel	29	78	79	186		1,892
35. Falls of persons	57	160	133	350		2,486
36. Falls of derricks, booms, etc	3	9	8	20		243
37. Run or fall of ore in or from ore bins	6	6	4	16		134
38. Machinery (other than 33 and 34)	27	38	45	110		1,525
39. Electricity						**79**
(*a*) Direct contact with trolley wire						
(*b*) Tool or bar striking trolley wire	1			1	14.29	*11*
(*c*) Contact with motor	1			1	14.29	*11*
(*d*) Others	4	1		5	71.42	*57*
40. Hand tools	57	114	125	296		2,581
41. Other causes						9,317
(*a*) Falling objects other than 31	83	190	162	435	29.92	*2,788*
(*b*) Flying objects	57	100	99	256	17.61	*1,641*
(*c*) Burns	20	44	23	87	5.98	*557*
(*d*) Miscellaneous	150	251	275	676	46.49	*4,331*
Total number injured by open-pit accidents	**642**	**1,463**	**1,398**	**3,503**		**27,012**
Grand total	21,096	19,601	19,097	59,794		293,231

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MINE ACCIDENTS: ENGLISH SPEAKING VERSUS NON-ENGLISH SPEAKING EMPLOYEES.[a]

By A. H. Fay.[b]

The employment of non-English speaking labor in American mines has been brought about by reason of the rapid expansion of the mining industry, beginning in the early eighties. The Americanization of this great body of labor, and its relation to accidents in the mining industry, are two problems of prime importance—the first as affecting citizenship and the growth of this Republic, and the second as an economic problem in mining costs. The former exerts an influence upon the latter, for the former implies education, social welfare, civic pride, and a general uplift to American ideals. Ignorance, dirty and filthy living conditions, ill-health, disregard for law and order, discontent and lack of civic interest, lead to indifference and carelessness, perhaps the greatest of all accident causes. Eliminate carelessness and at least 50 per cent of the accidents will disappear from industries.

IMMIGRATION TO AMERICAN MINES.

During the decade previous to the year 1880 (as well as in earlier years) the greater part of the employees in the coal and metal mines were Americans or representatives of the English, Scotch, Welsh, German, and Irish races. The majority of the men of foreign birth had been in this country for some years previous to the great expansion of the mining industry which began about this time. English-speaking miners continued to immigrate and to find employment in the mines in large numbers until about 1890. Since that year comparatively few immigrants from Germany and Great Britain have entered this industry, although Swedes and other Scandanavians have been constantly employed since the early eighties.

The employment in the mining industry of immigrants from southern and eastern Europe began about 1880. The Slovaks were the first arrivals and immigrated in considerable numbers. They were followed within a year or two by a few Magyars, and the number of immigrants of this race gradually increased each year. The Polish immigrants began about 1890, although individual members

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[a] Many of the statistics given herein are from Immigrants in Industries, a report of the Immigration Commission, 1911, S. Doc. 663, 61st Cong., 2d sess. vols. 6, 7, and 16.

[b] Address delivered at the Eighth Annual Safety Congress, National Safety Council, Cleveland, Ohio, Oct. 2, 1919.

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of the race had been coming for a period of nine or ten years. After the year 1890 Poles and Slovaks arrived in great numbers. A few Italians were employed before the year 1895, but the immigration of this race did not begin upon a large scale until about 1900. They were at first engaged in railroad construction and maintenance-of-way work and gradually drifted into the mines. Croatians were employed in some sections before 1890, and Serbians began to arrive in small numbers in the early nineties. The great bulk of all the immigration from southern and eastern Europe, however, has occurred within the past 18 years. Russians, Bulgarians, Roumanians, Ruthenians, Syrians, Armenians, Macedonians, Croatians, Serbians, as well as Poles, Magyars, Slovaks, and Italians, have been among the recent arrivals. The races of southern and eastern Europe have continued, up to the time of the war, to find employment in the mines in increasing numbers in almost every important mining district in the Eastern States and the lake district. Many of these recent immigrants have found their way to the Central and Western States. As a result of the rapid expansion of the mining industry, many mining communities have been founded, the populations of which are largely made up of immigrants who have arrived during recent years.

The pioneer American, English, Irish, German, Scotch, and Welsh miners are thus outnumbered and their positions are filled by the more recent immigrants. It is not difficult to account for this racial change which is still going on. The former operatives and their descendents had opportunities to secure more congenial and safer work in other industries. Many of them advanced in the industrial scale, becoming foreman and attaining other responsible positions. A large number have abandoned the occupation of miner for positions as day or shift men. Many also migrated and settled in the Middle West and Western States. Many of the former miners who left the industry entirely because of change in mining methods or the employment of immigrants entered mercantile, clerical, mechanical, or more pleasant work of other kinds. Many of the business and professional men in the mining towns were formerly mine workers. Their places were filled without difficulty with recent immigrants who were content with the wages and working conditions which prevailed in the mines. The wages paid in American mines seem very attractive to the recent arrivals of agricultural laborers from southern Europe.

FAILURE OF NATIVE-BORN TO ENTER THE INDUSTRY.

Another noteworthy tendency is seen in the fact that the racial displacement has occurred not only through the departure from the industry of the former employees, but also through the refusal of their children to enter the industry and the attitude of the parents themselves, who frequently discourage it. Of the total native born of fathers who were miners a large percentage enter occupations other than mining. The conclusion from the limited data at hand, therefore, seems to be that while the foreign-born males of more than 16 years of age, whenever employed, work in the mines, the persons native born of native father, together with the second-generation immigrants, are entering the mines only to a limited extent. This inference bears out in a large measure the experience of the mine operators, who state that the native born and the second-generation immigrants are not entering the mines in the same numbers as formerly and that the industry is receiving a constantly decreasing number of employees of these classes.

There exists a prejudice against recent immigrants, which also operates to an important extent in the displacement of former employees. Many Americans, English, Germans, Scotch, Irish, and Welsh did not and do not desire to be associated in the mines with the recent immigrant, and the feeling has become prevalent that a sort of reproach attaches to an intimate working relation with the foreigner. The races of former immigration have, therefore, left the industry and have entered other work which they feel is more dignified and congenial.

The relatively small number of American miners who remain in the industry must work side by side with the recent immigrant. To a greater or less degree the standard of safety in the mine is set by the demands of the ignorant and inexperienced immigrant, not by the more intelligent American, and the standard of life is decided to a large extent by those conditions which will be accepted by the same recent immigrant. In short, in order to work in the mining industry the American must compete with the recent immigrant, who, as a rule, is not very particular as to the living and working conditions. These conditions, however, are in most cases far better than in factory towns where congestion prevails.

Another effect of recent immigration from central and southern Europe has been the preventing of the English, Irish, Scotch, and German immigrant entering the mining industry. As already noted, these western European races were coming to the industry in large numbers prior to the early eighties but began to decline toward the end of the decade and practically stopped about 1893 or 1894. There can be no question but that the immigration of the Slovaks, Poles, Magyars, and other races operated to prevent the further coming of these older immigrants to the industry, precisely as it operated to drive out of the industry those already employed together with the native Americans. There is, therefore, no incentive for the English or German miner to migrate to the mining regions and compete with the Slovaks, Croatians, Italians, etc.

CITIZENSHIP.

A point of general interest is the tendency on the part of the different races of foreign birth working in the mining industry to acquire citizenship, and their general interest in public and civic affairs. The recent immigrant manifests little real or intelligent civic interest. This may be ascribed to his ignorance of our political methods, his inability to read or speak English, the social and political aloofness of these races in the more or less remote mining villages, and their desire to avoid taxation. Those who reside in or near the cities seem to exhibit more interest than do those of the isolated communities. The Bohemians and Moravians, 94 per cent of whom can read some language (Table 44), take a much more active part in civic affairs than any other race of recent immigration in the bituminous districts of Pennsylvania. Among the other Slavic races, the Slovaks (82 per cent read) and Poles (77 per cent read) lead in this regard, while the Croatians (67 per cent read) make the poorest showing. It is almost the universal statement that this latter race shows but little civic interest and that very few become naturalized. The Italians (81 per cent read) both north and south, are more active than the Slavic races in their efforts to become citizens, and appear to take a more active part in civic affairs. In cases where there seems to be encouraging civic activity it is nearly always due, not to their own intelligent efforts to attain citizenship and exercise its privileges, but to the influence of interested politicians who in many cases may be a leader of their own race; for example, an intelligent banker and steamship ticket agent. It seems true of all the later immigrating races that they take far less interest in civic affairs than did the German (97 per cent read) and English (98.5 per cent read) immigrants.

The foreigner should be taught that the laws of America were made to protect, and not harass, every good citizen, rich and poor alike, and it is the duty of well-informed Americans to make this understood. If well-meaning foreigners, the making of good citizens, are left entirely to their own devices, they fall an easy prey to the designing I. W. W. and the Bolsheviki. Somebody who understands their language fully, and in whom they have confidence should explain to them that they are being deceived so long as they listen to anti-American propaganda.

CHURCH AND THE IMMIGRANT.

The church association between the native Americans and the southern and eastern European immigrants is limited. The general attitude of the native churches toward the immigrant is one of indifference, and there is a strong inclination in many communities to shun association with the immigrant in church activities. In many cases where missionary efforts are made by native churches of any denomination services for the immigrants are usually held in barns, stores, or other unattractive places, thereby lessening the interest in them. The races from the southern European countries, which compose a large portion of the mining population, have been reared where there is no social caste in religious organizations, and have worshipped in buildings which are unsurpassed in beauty and grandeur the world over. When these people are offered services held in stores, barns, and similar buildings their interest in the service naturally is less and they become indifferent. Lack of interest in church affairs tends to decrease activities in civic affairs. The church and its allied organizations can be an important agent in teaching these immigrants the rudiments of the English language and pointing out to them their duties as American citizens.

LACK OF MINING EXPERIENCE ON THE PART OF RECENT IMMIGRANTS.

Men of the races of the old immigration (western Europe) have been employed in the mines of the United States for many years. As a result of their experience both in this country and abroad, they are far better qualified as miners than are the southern and southeastern Europeans. The older immigrants speak English either as their native tongue or, as in the case of the Germans and Scandinavians, because of long residence in this country. They may be treated in almost every respect upon the same basis as the American miners.

The employees of the races of the recent immigration, on the other hand, have been in the United States for so short a period of time that even though it be assumed that they have been employed in mining ever since their arrival, they must have had but a brief experience at most in the mines of this country. The data further show that very few of their number had mining experience abroad. (Table 41.) Over 80 per cent of the Scotch and English miners had mining experience in their native country before entering the American mines, while for the south Italian and Croatian less than 5 per cent have had mining experience. Most of the latter were farm laborers in their native countries. Upon coming to the United States they decided to follow the occupation of mining because the work was better paid than any other obtainable, although many of them had been here only a few months and many more but a year or two. Under these circumstances it is not surprising that they know little or nothing of rock formations, of fire damp, of the properties of coal dust, and of the handling of explosives—matters about which every miner should be thoroughly informed. To determine whether a piece of slate or roof is or is not likely to fall often requires a considerable degree of experience, and the majority of the Slavs, Magyars, and Italians have not this experience.

IMMIGRATION IN ITS RELATION TO MINING ACCIDENTS.

The mines are presumably less safe than they would be with native American, English, Irish, Scotch, Welsh, or German labor, because recent immigrants often accept more dangerous working conditions than the first-named employees. Furthermore, the later immigrants are ignorant and untrained, and are a source of danger to themselves and to the other workmen. Among the older mine workers the feeling is strong that the employment of non-English speaking races has complicated the problem of safety in the mines. They assert that carelessness on the part of recent immigrants, and the igorance of those who are suspected of having obtained their places without having had the required experience as miners, have tended to render the mines less safe and thus increase accidents.

A large proportion of the deaths and injuries reported for the coal mines of the United States occur among the non-English speaking miners. The employees, consisting of the races of southern and eastern Europe, having had little experience in mining either in this country or abroad, are particularly liable to accidents, and as the responsibility for accidents rests in many cases with the men injured, to say that they are particularly liable to accidents, is in effect to say that they are responsible for a considerable proportion of all the accidents occuring in the mines.

The mine accidents for which the workmen are themselves responsible fall naturally into two classes—those due to carelessness and those due to ignorance. As regards the first of these it is probable that the foreigner is no greater offender than the person of native birth. Many of the Americans and other English-speaking miners are undoubtedly reckless, and a very large proportion of all the accidents occuring among their number seem to be due to this cause. Grave risks are often incurred for the sake of avoiding a little extra labor. Props are left unplaced, open lamps are used instead of closed lamps, cars are driven in a careless manner, explosives are handled recklessly—all in defiance of the most elementary rules prepared by men of long experience in the industry.

Among the recent immigrants, on the other hand, many of the accidents are unquestionably due to ignorance, for by reason of their lack of experience they do not see nor realize the dangers that confront them; nor do they readily comprehend the necessary precautions that must be taken to make their working places safe.

TABLE 41.—*Foreign-born mine employees, by nationalities, showing agricultural and mining experience prior to entering the United States.*

[Compiled from Immigrants in Industries, a report of the Immigration Commission, 1911. S. Doc. 663, 61st Cong., 2d sess., vols. 6, 7, 16.]

Nationality.	United States.			Pennsylvania (bituminous).			Ohio, Indiana, Illinois.			Kansas, Oklahoma.			West Virginia.			Michigan (copper).			Lake district (iron).		
	Number.	Per cent.		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.		Number.	Per cent.	
		Mines.	Agriculture.		Mines.	Agriculture.		Mines.	Agriculture.		Mines.	Agriculture.		Mines.	Agriculture.		Mines.	Agriculture.		Mines.	Agriculture.
Bohemian and Moravian	408	57.6	16.4	188	41.0	22.9	196	72.4	10.7												
Bulgarian	158	9.5	75.3										115	2.6	89.6						
Canadian (French)																208		56.3			
Croatian	1,212	3.6	84.7	804	3.4	85.0	155	7.1	81.3				242	2.5	85.9	485	5.2	59.0	247	6.1	72.9
English	1,277	82.6	2.6	525	78.5	2.3	547	87.8	1.5	129	87.6	5.4				727	60.2	7.6	147	53.7	6.8
Finnish																1,408	2.7	74.8	916	.4	71.2
French	352	72.2	6.8	181	56.9	9.4				144	90.3	3.5									
German	1,423	55.0	18.6	663	49.9	19.2	575	59.7	17.6	114	65.8	14.9				84	13.1	40.5			
Irish	321	59.2	25.9	169	53.8	24.3															
Italian, North	4,840	13.7	57.2	2,083	5.3	62.0	1,551	22.8	52.0	853	21.6	46.8	353	3.7	77.6	515	5.2	63.7	600	14.7	52.3
Italian, South	2,883	7.7	66.5	1,131	4.8	63.9	361	23.3	62.6	319	9.4	40.1	1,072	5.1	78.4				223	9.4	75.3
Lithuanian	1,570	4.3	79.2	398	4.5	79.9	1,023	3.6	79.7	109	11.0	66.1									
Magyar	2,423	10.9	68.5	1,472	9.2	65.8	581	17.7	69.7				322	5.0	78.3	108	5.6	78.7			
Mexican	98	71.4	17.3							98	71.4	17.3									
Montenegrin	118	4.2	91.5																		
Polish	3,771	9.8	68.9	2,578	7.2	68.5	741	14.2	70.9	175	33.1	44.6	277	7.2	82.3				383	9.4	62.1
Roumanian	97	7.2	82.5																		
Russian	1,389	7.8	79.8	890	7.3	78.8	344	7.3	86.9	88	13.6	67.0									
Ruthenian	151	15.9	66.2	130	13.8	68.5															
Scotch	561	88.2	1.8	187	84.5	1.6	237	92.4	1.3	90	87.8	3.3									
Slovak	5,378	10.7	68.4	4,237	8.7	67.7	684	15.1	75.3	122	54.1	34.4	335	10.4	75.5				164	5.5	70.1
Slovenian	1,248	20.0	57.6	1,013	14.4	61.4	86	34.8	45.3	99	53.5	35.4				142	5.6	67.6	321	3.7	69.2
Swedish	142	15.5	57.7													104	18.3	47.1	154	10.4	48.1
Welsh	178	87.6	1.7				92	91.3	1.1												
Total	[a]31,325	20.7	58.0	[a]17,246	14.4	61.2	7,173	30.5	52.2	2,340	43.0	34.6	2,716	10.4	73.9	3,781	14.6	55.8	3,155	8.5	62.3

[a] Figures include only races with 100 or more miners reporting. The totals are for all foreign-born, and do not necessarily check by addition.

Lack of experience in the mines has a marked effect upon the high accident rate, as indicated by a study of accidents among the immigrants whose experience in mines before coming to this country was known. The fatal, serious, and nonfatal injury rates in the coal mines of Pennsylvania and West Virginia are approximately 14.5 per 1,000 for those of whom 10 per cent had mining experience prior to coming to the United States. The accident rate for those of whom 10 to 20 per cent had mining experience is about 12 per 1,000, showing a rapid decrease as mining experience increases. It would seem from this, while experience is limited, these immigrants soon gain sufficient knowledge to use a certain amount of caution, thus giving a decline in accident rate.

As contrasted with the decrease in accident rates among those of whom 5 to 30 per cent have had mining experience, the accident rate based on similar data for those of whom 50 to 60 per cent have had mining experience prior to coming to this country, is 10.5, whereas the rate is 12 for those of whom 80 to 90 per cent have had experience in the mines. A marked increase with the extra experience. This is largely due to the tendency of those with considerable experience to become more or less careless or reckless and to think that they can slight certain features of work without an accident. A new man entering the mine would not consider for a moment crimping a cap with his teeth, whereas many of the men who have been in the mines for 8 to 10 years would not hesitate and do not hesitate to crimp caps with their teeth. Other instances of carelessness might be cited. The available data, therefore, seem to indicate that inexperience is responsible for many accidents, and that a little experience begets much caution on the part of the recent or new employee. As indicated above, there is thus a tendency toward a rapid reduction in accident rates to a point where between 30 to 40 per cent of the employees have had mining experience. Beyond this percentage caution wanes and is replaced by carelessness, with a resultant increase. The green miner may be overcautious, but he lacks experience. The seasoned miner has the experience, but too often caution is replaced by carelessness. Caution combined with experience will go far toward accident reduction.

Another element of danger is contributed by the fact that few of the recent immigrants speak or understand English (Tables 42, 43, and 44), while almost none are able to read or write the English language, and placards of warning do not reach them. It is probable that the instructions of the mine bosses and inspectors are, because of this fact, frequently misunderstood. An inspector, for example, tells an immigrant miner, in English, of course, that his roof needs propping. The miner seems to understand, but does not, and a fall results. In some mines printed signs are used to indicate

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the presence of gas or other peril. These signs are quite unintelligible to most of the foreigners. A common language is absolutely necessary in every safety-first campaign. Accident rates are much lower in England, France, Belgium, Germany, Austria, and Japan than in the United States. In these countries but few foreigners are employed, a common language being used in each country. The difference in fatality rates can not be entirely attributed to the lack of mixed languages, but certainly a large percentage of the accident reduction may be attributed to the "common language" mines.

A comparison of accident rates with the ability of the miner to read some language or to speak the English language shows that the ability to read, although it may not be English, has a greater influence on accident reduction than the ability to speak English. This may be accounted for by the fact that ability to read develops a higher degree of intelligence and places the employee in a better position to realize dangers more readily than one who can not read. Furthermore, if he is able to read he is more likely to heed danger signs put up in certain places.

The recent immigrant, because of his lack of experience, his inability to speak English, and his keenness for earning money, is often willing to work in places where more experienced or more intelligent men would refuse to work. For the same reasons he will frequently be satisfied with and accept mine equipment too defective for safety.

OCCUPATION OF ENGLISH-SPEAKING AND NON ENGLISH-SPEAKING RACES.

Comparative figures by occupations, based on the pay roll of 10 typical coal-mining companies in Pennsylvania, show that about 33 per cent of the English-speaking employees are employed as pick miners, as compared with about 52 per cent for the southeastern Europeans. As a matter of fact, the groups including trackmen, car runners, drivers, machine runners and helpers, pick miners and loaders the English-speaking employees represent about 61 per cent of the total, as compared with 82 per cent for the southeastern Europeans. These figures therefore indicate that the non-English-speaking foreigner is employed in the most hazardous of the mine occupations; hence one reason for the higher accident rate.

TABLE 42.—*Number of employees in bituminous coal mines and metal mines, by nationality, showing percentage who can speak English.*

[Compiled from Immigrants in Industries, a report of the Immigration Commission, 1911. S. Doc. 663, 61st Cong., 2d sess., vols. 6, 7, 16.]

Nationality.	Bituminous coal mines.								Metal mines.							
	Pennsylvania.		West Virginia.		Ohio, Indiana, Illinois.		Kansas, Oklahoma.		Copper—Michigan.		Iron—Minnesota.		Iron—Alabama.		Iron—Michigan.	
	Number employed.	Per cent speaking English.	Number employed.	Per cent speaking English.	Number employed.	Per cent speaking English.	Number employed.	Per cent speaking English.	Number employed.	Per cent speaking English.	Number employed.	Per cent speaking English.	Number employed.	Per cent speaking English.	Number employed.	Per cent speaking English.
Bohemian and Moravian	451	69.4			247	77.3										
Canadian (French)									291	95.5					40	100.0
Croatian	1,945	54.2	255	71.0	180	78.9			484	44.0	178	70.8			158	32.3
Finnish									1,498	37.9	405	76.3			661	60.5
French	328	71.6			190	68.4	206	74.3								
German	1,511	91.0	110	90.0	841	89.4	177	91.0	113	100.0						
Italian, North	3,323	58.8	391	65.5	1,685	68.0	1,129	62.4	533	58.0	134	57.5			541	45.3
Italian, South	2,197	60.3	1,157	63.9	416	50.2	418	66.0	56	62.5	77	50.6	121	61.2	54	48.1
Lithuanian	630	71.1	41	92.47	1,080	75.9	119	88.2	40	22.5						
Magyar	3,489	50.8	337	63.5	596	50.0	48	75.0	79	13.9						
Montenegrin											46	47.8				
Norwegian									41	97.6						
Polish	5,900	50.3	294	65.0	787	57.3	209	65.1	65	69.2	86	73.3			393	51.1
Russian	1,265	56.9	73	68.5	371	67.9	101	70.3								
Slovak	9,853	57.1	382	63.1	778	73.5	124	65 3			52	76.9			127	81.9
Slovenian	1,534	59.6	51	54.9	94	72.3	185	68.1	157	65.0	298	79.5			65	50.8
Swedish	216	97.2			67	92.5			104	80.8					160	89.4
Total	32,642	58.2	3,091	63.6	7,332	69.7	2,716	69.1	3,461	52.7	1,276	70.5	121	61.2	2,190	57.3

TABLE 43.—*Percentage of employees who read (some language), by general nativity and race.* [a]

[Compiled from Immigrants in Industries, a report of the Immigration Commission, 1911. S. Doc. 663, 61st Cong., 2d sess, vols. 6, 7, 16.]

General nativity and race.	Michigan.				Oil refining.	
	Copper mines.		Iron mines.			
	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.
Native-born of native father:						
White	145	99.3	51	100.0	37	100.0
Native-born, of foreign father, by country of birth of father:						
England (includes Canada)	486	98.5	56	100.0	....	....
Finland	64	100.0	....	....	....	....
Germany	188	99.5	....	....	....	....
Ireland	78	98.7	....	....	113	100.0
Sweden	....	....	46	100.0	....	....
Foreign-born, by race:						
Canadian (French)	291	75.3	44	86.4	....	....
Canadian (other)	77	98.7	....	....	....	....
Croatian	485	82.3	156	98.1	....	....
English	820	98.7	135	99.3	....	....
Finnish	1,509	99.5	656	98.8	....	....
German	114	99.1	....	....	....	....
Irish	40	87.5	....	....	108	95.4
Italian, North	537	94.4	529	94.7	....	....
Italian, South	57	89.5	54	90.7	182	48.4
Lithuanian	....	....	....	....	62	88.7
Magyar	81	92.6	....	....	....	....
Norwegian	41	100.0	....	....	....	....
Polish	65	90.8	385	85.2	221	90.0
Ruthenian	....	....	....	....	90	72.2
Slovak	....	....	123	88.6	130	88.5
Slovenian	156	98.7	70	98.6	....	....
Swedish	105	98.1	160	100.0	....	....
Grand total	**5,557**	**95.4**	**2,800**	**94.9**	**1,116**	**84.2**
Total native-born of foreign father	927	99.0	215	99.5	214	100.0
Total native-born	1,072	99.1	268	99.6	251	100.0
Total foreign-born	4,485	94.5	2,532	94.4	865	79.7

[a] This table includes only races with 40 or more males reporting. The totals, however, are for all races, and do not necessarily check by addition.

TABLE 44.—*Percentage of coal-mine employees who read (some language), by general nativity and race.*[a]

[Compiled from Immigrants in Industries, a report of the Immigration Commission, 1911, S. Doc. 663, 61st Cong., 2d sess., vols. 6, 7, and 16.]

General nativity and race.	United States, bituminous.		Anthracite coal mines.		Bituminous coal mines.							
			Pennsylvania.		Pennsylvania.		Ohio, Indiana, Illinois.		Oklahoma, Kansas.		Alabama, Virginia, West Virginia.	
	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.
Native-born of native father:												
White	18,097	96.9	23	100.0	6,406	97.2	5,833	97.4	1,616	97.5	4,242	95.3
Negro	6,479	75.3			900	87.9	566	91.1	374	90.1	4,639	69.7
Native-born of foreign father by country of birth of father:												
Austria-Hungary	813	96.4			584	95.7	172	98.8				
Belgium	50	98.0										
England (includes Canada)	1,822	98.5			954	98.1	581	99.1	174	99.4	66	97.0
France	168	97.6			62	98.4	67	100.0				
Germany	2,184	99.1			1,188	99.0	848	99.4	100	100.0	48	93.8
Ireland	1,340	98.3			802	98.1	318	98.4	135	100.0	85	96.5
Italy	182	94.0			62	90.3	53	96.2	53	96.2		
Lithuania			42	100.0								
Poland			61	95.1								
Russia	171	95.9			87	93.1	56	100.0				
Ruthenia			62	100.0								
Scotland	906	99.6			423	99.5	279	99.6	138	100.0	66	98.5
Sweden	64	100.0										
Wales	462	98.5			210	98.6	208	98.1				
Foreign-born, by race:												
Bohemian and Moravian	737	94.6			451	93.1	249	97.6				
Bulgarian	176	78.4									123	87.8
Croatian	2,404	66.9			1,957	65.5	182	70.9			251	73.7
Dutch	104	98.1			55	98.2						
English	2,478	97.7			1,310	97.1	803	98.1	248	99.6	117	96.6

[a] This table includes only races with 40 or more males reporting. The totals, however, are for all races, and do not necessarily check by addition.

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TABLE 44.—*Percentage of coal-mine employees who read (some language), by general nativity and race*—Continued.

General nativity and race.	United States, bituminous.		Anthracite coal mines.		Bituminous coal mines.							
			Pennsylvania.		Pennsylvania.		Ohio, Indiana, Illinois.		Oklahoma, Kansas.		Alabama, Virginia, West Virginia.	
	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.	Number.	Per cent who read.
Foreign-born, by race—Continued.												
Finnish	70	95.7										
French	765	91.0			334	88.9	190	90.5	205	94.1		
German	2,659	96.8			1,522	95.3	849	98.6	179	98.9	109	100.0
Greek	113	65.5			75	57.3						
Irish	924	93.5			660	93.0	126	92.9	94	97.9	44	93.2
Italian, North	6,584	87.8			3,346	86.3	1,700	93.0	1,149	90.9	389	68.9
Italian, South	4,197	65.7	50	52.0	2,219	67.2	417	63.0	412	81.6	1,149	58.1
Italian (not specified)	112	89.3			98	88.8						
Lithuanian	1,878	79.5	284	57.7	638	74.5	1,081	80.4	120	93.3		
Magyar	4,515	89.2			3,508	88.5	617	93.8	49	81.6	341	88.9
Mexican	107	81.3							105	80.9		
Montenegrin	134	69.4									91	62.6
Polish	7,293	77.3	263	68.4	5,991	76.9	798	76.3	208	85.6	296	80.7
Roumanian	154	74.7			102	69.6						
Russian	1,826	70.8			1,271	69.0	373	73.7	105	77.1	77	76.6
Ruthenian	303	59.4	202	65.8	281	58.0						
Scotch	1,148	99.1			561	98.8	346	99.1	141	100.0	100	100.0
Serbian	130	77.7			85	75.3						
Slovak	11,238	82.4	185	73.0	9,945	81.8	784	86.0	129	91.5	380	86.6
Slovenian	1,877	83.6			1,539	83.1	96	81.3	185	95.7	57	61.4
Swedish	305	100.0			214	100.0	67	100.0				
Welsh	396	94.7			189	94.2	160	95.6				
Grand total	**86,908**	**86.7**	**1,239**	**71.7**	**48,747**	**85.2**	**18,333**	**92.6**	**6,785**	**93.6**	**13,043**	**80.3**
Total native-born of foreign father	8,240	98.3	231	98.3	4,497	98.0	2,649	99.1	753	98.4	341	96.5
Total native-born	32,818	93.0	254	98.4	11,803	96.8	9,048	97.5	2,745	96.8	9,222	82.5
Total foreign-born	54,090	82.9	985	64.8	36,944	81.6	9,285	87.8	4,040	91.4	3,821	75.0

Percentage of employees by occupation and English-speaking and non-English-speaking races.[a]

Occupations.	Americans and western Europeans.		Southeastern Europeans.	
	Number.	Per cent.	Number.	Per cent.
Superintendents	10	0.78	....	....
Foremen	14	1.10	....	....
Bosses	76	5.96	6	0.28
Inspectors	10	.78	15	.70
Engineers and motormen	50	3.92	12	.56
Firemen	29	2.27	10	.47
Electricians and helpers	12	.94	7	.33
Blacksmiths and machinists	33	2.59	13	.61
Carpenters and masons	46	3.61	9	.42
Track and road men	64	5.02	21	.97
Car runners, droppers, etc.	47	3.69	49	2.28
Drivers and teamsters	124	9.73	67	3.12
Machine runners and helpers	75	5.88	148	6.90
Pick miners	428	33.57	1,107	51.61
Loaders and scrapers	45	3.53	379	17.67
Trappers	16	1.26	20	.93
Pipe and pump men	20	1.57	7	.33
Laborers	176	13.80	271	12.82
Total	1,275	100.00	2,141	100.00

[a] Represents 10 typical bituminous coal mining companies of Pennsylvania.

ACCIDENTS BY NATIONALITY IN PENNSYLVANIA AND WEST VIRGINIA.

In the Pennsylvania anthracite mines (Table 45) 43 per cent of the employees are English-speaking, and this number is charged with only 28.8 per cent of the fatalities, whereas the other 56 per cent (representatives of continental Europe) sustained 71 per cent of the fatalities. Likewise in the Pennsylvania bituminous mines the English-speaking employees represent 35 per cent of the total and are charged with 27 per cent of the fatalities, whereas the other 65 per cent (representatives of continental Europe) are charged with 73 per cent of the fatalities. As regards the figures for West Virginia (Table 45), the English-speaking employees represent 67 per cent, and notwithstanding the fact that this includes 17 per cent of colored employees, only 53 per cent of the fatalities are charged to the English-speaking employees, whereas the other 33 per cent sustained 47 per cent of the fatalities. Almost the same ratio holds for nonfatal injuries in three groups of mines cited.

Had the fatality and injury rate for the English-speaking American been maintained throughout the three groups of mines, there would have been a saving of 716 fatalities and 900 very serious injuries, a strong argument for Americanization and education of the miner.

Original from PRINCETON UNIVERSITY

TABLE 45.—*Coal-mine accidents in Pennsylvania and West Virginia, by nationality of victims.*[a]

Nationality.	Pennsylvania (anthracite).								Pennsylvania (bituminous).								West Virginia.							
			Killed.			Injured.					Killed.			Injured.					Killed.			Injured.		
	Men employed (2 years).	Per cent of total.	Number.	Per cent of total.	Per 1,000 employed.	Number.	Per cent of total.	Per 1,000 employed.	Men employed (2 years.)	Per cent of total.	Number.	Per cent of total.	Per 1,000 employed.	Number.	Per cent of total.	Per 1,000 employed.	Men employed (2 years.	Per cent of total.	Number.	Per cent of total.	Per 1,000 employed.	Number.	Per cent of total.	Per 1,000 employed.
American:																								
White	116,730	34.98	245	21.25	2.10	783	31.26	6.71	102,532	29.28	193	21.98	1.88	818	26.21	7.98	78,966	48.93	313	36.65	3.96	1,234	43.99	15.63
Negro	(b)	.....	.....	.....	.....	.....	.....	.....	(b)	.....	.....	.....	.....	.....	.....	.....	26,895	16.66	118	13.82	4.39	391	13.94	14.54
English	7,468	2.24	30	2.60	4.02	46	1.84	6.16	7,949	2.27	19	2.16	2.39	60	1.92	7.55	926	.57	14	1.64	.....	25	.89	.....
Irish	10,410	3.12	29	2.51	2.79	64	2.55	6.15	4,451	1.27	13	1.48	2.92	39	1.25	8.76	671	.42	4	.47	.....	5	.18	.....
Scotch	1,121	.33	4	.35	3.57	2	.08	1.78	4,391	1.26	10	1.14	2.28	49	1.57	11.16	450	.28	5	.58	.....	2	.07	.....
Welsh	8,263	2.48	25	2.17	3.03	75	2.99	9.08	1,803	.51	5	.57	2.77	13	.42	7.21	106	.07	1	.12	.....	3	.11	.....
Total	**143,992**	**43.15**	**333**	**28.88**	**2.31**	**970**	**38.72**	**6.74**	**121,126**	**34.59**	**240**	**27.33**	**1.98**	**979**	**31.37**	**8.08**	**108,014**	**66.93**	**455**	**53.28**	**4.21**	**1,660**	**59.18**	**15.37**
Austrian	19,342	5.80	69	5.98	3.57	114	4.55	5.89	21,775	6.22	86	9.80	3.95	278	8.91	12.77	3,642	2.26	40	4.68	10.98	122	4.35	33.50
Belgian	.....	.....	.....	.....	.....	.....	.....	.....	1,770	.51	2	.23	1.13	23	.74	12.99	114	.07	1	.12	.....	2	.07	.....
Bohemian	.....	.....	.....	.....	.....	.....	.....	.....	1,035	.30	2	.23	1.93	7	.22	6.76	65	.04	4	.47	.....	2	.07	.....
Bulgarian	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	202	.13	2	23	.....	1	.04	.....
Croatian	173	.05	.....	.....	.....	.....	.....	.....	2,142	.61	4	.46	1.87	7	.22	3.27	638	.40	.....	.....	.....	6	.21	.....
French	.....	.....	.....	.....	.....	.....	.....	.....	1,531	.44	5	.57	3.27	14	.45	9.14	77	.05	1	.12	.....	3	.11	.....
German	5,637	1.69	24	2.08	4.26	32	1.28	5.68	7,592	2.17	15	1.71	1.98	60	1.92	7.90	976	.60	3	.35	.....	33	1.18	.....
Finnish	.....	.....	.....	.....	.....	.....	.....	.....	414	.12	1	.11	.....	5	.16	.....	.....	.....	.....	.....	.....	.....	.....	.....
Granish	.....	.....	.....	.....	.....	.....	.....	.....	862	.25	2	.23	.....	14	.45	.....	345	.21	4	.47	.....	1	.04	.....
Greek	2,363	.71	12	1.04	5.08	21	.84	8.89	1,087	31	1	.11	.92	14	.45	12.88	1,074	.67	14	1.64	13.04	25	.89	23.28
Horwat	791	.24	.....	.....	.....	2	.08	.....	7,430	2.12	15	1.71	2.02	33	1.06	4.44	788	.49	4	.47	.....	8	.29	.....
Hungarian	6,371	1.91	14	1.21	2.20	29	1.16	4.55	21,094	6.02	63	7.18	2.99	146	4.68	6.92	9,620	5.96	41	4.80	4.26	135	4.81	14.03
Italian	26,408	7.91	104	9.02	3.94	224	8.94	8.48	51,484	14.70	157	17.88	3.05	519	16.63	10.08	18,609	11.53	127	14.87	6.82	381	13.58	20.47
Lithuanian	26,733	8.01	127	11.02	4.75	247	9.86	9.24	4,794	1.37	19	2.16	3.96	71	2.27	14.81	921	.57	6	.70	.....	32	1.14	.....
Litvitch	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	460	.28	2	.23	.....	8	.29	.....
Montenegrin	48	.01	.....	.....	.....	1	.04	.....	242	.07	.....	.....	.....	2	.07	.....	279	.17	1	.12	.....	4	.14	.....
Polish	55,274	16.56	286	24.81	5.17	500	19.96	9.05	34,611	9.88	88	10.02	2.54	328	10.51	9.48	5,080	3.15	54	6.33	10.63	120	4.28	23.62
Roumanian	.....	.....	.....	.....	.....	.....	.....	.....	128	.04	1	.11	.....	1	.03	.....	870	.54	6	.70	.....	20	.71	.....
Russian	22,285	6.68	102	8.85	4.58	170	6.79	7.63	14,694	4.20	41	4.67	2.79	114	3.65	7.76	4,025	2.49	51	5.97	12.67	138	4.92	34.29
Serbian	.....	.....	.....	.....	.....	.....	.....	.....	131	.04	3	.34	.....	7	.22	.....	317	.20	2	.23	.....	7	.25	.....

Slovenian	22,042	6.61	76	6.59	3.45	167	6.66	7.58	51,344	14.66	125	14.24	2.43	463	14.83	9.02	3,508	2.17	22	2.58	6.27	71	2.53	20.24
Spanish	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	591	.37	8	.94	.....	9	.32	.....
Swedish	570	.17	.....	.....	.....	9	.36	.....	3,444	.98	6	.69	1.74	31	.99	9.00	33	.02	.....	.....	.....	4	.14	.....
Syrian	149	.04	.....	.....	.....	4	.16	.....	277	.08	1	.11	.....	.....	.....	.....	213	.13	2	.23	.....	5	.18	.....
Turk	.....	.....	.....	.....	.....	.....	.....	.....	117	.03	.....	.....	.....	.....	.....	.....	211	.13	.....	.....	.....	2	.07	.....
Tyrolean	1,075	.32	2	.17	1.86	7	.28	6.51	769	.22	.....	.....	.....	2	.07	.....	.....	.....	.....	.....	.....	.....	.....	.....
Not segregated	451	.14	4	.35	.....	8	.32	.....	240	.07	1	.11	.....	3	.10	.....	714	.44	4	.47	.....	6	.21	.....
Total	**189,712**	**56.85**	**820**	**71.12**	**4.32**	**1,535**	**61.28**	**8.09**	**229,007**	**65.41**	**638**	**72.67**	**2.79**	**2,142**	**68.63**	**9.35**	**53,372**	**33.07**	**399**	**46.72**	**7.48**	**1,145**	**40.82**	**21.45**
Grand total	333,704	100.00	1,153	100.00	3.46	2,505	100.00	7.51	350,133	100.00	878	100.00	2.51	3,121	100.00	8.91	161,386	100.00	854	100.00	5.29	2,805	100.00	17.38

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[a] Based upon official records for the years 1915 and 1916 as reported by the State departments of mines.

[b] Not segregated, as only a few are employed.

STATE MINE INSPECTORS,[a] GEOLOGISTS, AND OTHER MINE OFFICIALS IN THE UNITED STATES.

January 1, 1920.

ALABAMA.

Name.	Designation.	Address.
Charles H. Nesbitt	Chief mine inspector	419–423 Chamber of Commerce, Birmingham.
Prof. Eugene A. Smith	State geologist, University of Alabama	University.

ALASKA.

Sumner S. Smith	United States mine inspector	Eska (care of Alaskan Engineering Commission).
B. V. Stewart	Territorial mine inspector	Juneau.

ARIZONA.

G. M. Butler	Director, State bureau of mines	Tucson.
G. H. Bolin	State mine inspector	Phoenix.
Edward Massey	Deputy mine inspector	Bisbee.
John Harper	do	Globe.
J. C. Wilson	do	Kingman.
Olaf P. Jenkins	State geologist, University of Arizona	Tucson.

ARKANSAS.

James G. Ferguson	Commissioner of mines, manufactures, and agriculture.	Little Rock.
John T. Fuller	State mineralogist	Do.
Thomas H. Shaw	State mine inspector	Fort Smith.
Prof. N. F. Drake	State geologist, University of Arkansas	Fayetteville.

CALIFORNIA.

A. J. Pillsbury	Chairman, industrial accident commission	525 Market Street, San Francisco.
H. M. Wolflin	Superintendent of safety	Underwood Building, San Francisco.
G. Chester Brown	Chief mining engineer	525 Market Street, San Francisco.
J. Wesley Gebb	Mining engineer	Underwood Building, San Francisco.
F. L. Lowell	do	525 Market Street, San Francisco.
F. McN. Hamilton	State mineralogist, California State mining bureau.	Ferry Building, San Francisco.
E. S. Boalich	Mining engineer, California State mining bureau	Do.

COLORADO.

Horace F. Lunt	Commissioner, bureau of mines, State of Colorado.	Denver.
Vincent C. Perini, jr	Secretary	Do.
T. R. Henahen	Inspector, district No. 1	Do.
M. J. McCarthy	Inspector, district No. 2	Cripple Creek.
R. J. Murray	Inspector, district No. 3	Leadville.
Robert Innes	Inspector, district No. 4	Montrose.
James Dalrymple	Chief inspector of coal mines	State capitol, Denver.
Prof. Russell D. George	State geologist, University of Colorado	Boulder.

CONNECTICUT.

Prof. Herbert E. Gregory	Superintendent, State geological and natural history survey, Yale University.	New Haven.

FLORIDA.

Herman Gunter	State geologist, Florida State geological survey	Tallahassee.

GEORGIA.

Prof. S. W. McCallie	State geologist, geological survey of Georgia	Atlanta.

HAWAII.

Charles T. Bailey	Commissioner of public lands	Honolulu.

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[a] This report being for metal mines, only the chief of the coal-mine inspection service is listed herein.

IDAHO.

Name.	Designation.	Address.
Robert N. Bell	State mine inspector, mining department	Boise.
Francis C. Thomson	Secretary bureau of mines and geology and dean, School of mines, University of Idaho.	Moscow.

ILLINOIS.

Joseph C. Thompson	Director, department of mines and minerals	Springfield.
Martin Bolt	Assistant director	Do.
Frank W. De Wolf	Chief, State geological survey division, department of registration and education.	Urbana.
William Hall	President, miners' examining board	Springfield.

INDIANA.

Samuel R. Artman	Chairman, industrial board of Indiana	Room 122, State capitol, Indianapolis.
Cairy Littlejohn	Chief mine inspector	Room 102, State capitol, Indianapolis.
Prof. W. N. Logan	State geologist, department of geology and natural resources.	Indianapolis.

IOWA.

E. M. Gray	President, Iowa State mining board	Des Moines.
L. E. Stamm	Secretary, Iowa State mining board	Do.
W. E. Holland	Inspector, district No. 1	Albia.
R. T. Rhys	Inspector, district No. 2	Ottumwa.
Edward Sweeney	Inspector, district No. 3	Des Moines.
Prof. George F. Kay	Director, Iowa geological survey	Iowa City.

KANSAS.

J. H. Crawford	Commissioner of labor and industry	Topeka.
James Sherwood	Assistant commissioner in charge of mine inspection department.	Pittsburg.
Dr. Raymond C. Moore	State geologist, University of Kansas	Lawrence.

KENTUCKY.

C. J. Norwood	Chief inspector of mines	Lexington.
J. B. Barton	Commissioner of geology and forestry, Kentucky geological survey.	Frankfort.
W. R. Jillson	State geologist	Do.

LOUISIANA.

Prof. F. V. Emerson	In charge Louisiana soil and geological survey	Baton Rouge.

MARYLAND.

Lawrence Dunn	State mine inspector	Midland.
Dr. Edward B. Mathews	State geologist, Maryland geological survey, Johns Hopkins University.	Baltimore.

MICHIGAN.

Richard H. Fletcher	Commissioner, department of labor	Lansing.
Perry J. Ward	Deputy commissioner, department of labor	Do.
A. K. Smith	Coal-mine inspector	613 North Sherman Street, Bay City.
John C. Clemans	Mine inspector for Gogebic County	Bessemer.
Swan Oleson	Deputy mine inspector for Gogebic County	Do.
Mat Salo	do	Ironwood.
John Brickman	Mine inspector for Keweenaw County	Ahmeek.
Gust. Keikkala	Deputy mine inspector for Keweenaw County	Mohawk.
Alfred James	Mine inspector for Houghton County	Laurium.
John Allaria	Deputy mine inspector for Houghton County	Calumet.
Harry J. King	do	Laurium.
Michael Pakkala	do	Atlantic mine.
Fred Mitchell	Mine inspector for Iron County	Iron River.
James H. Yelland	Mine inspector for Marquette County	Ishpeming.
Frank L. Larson	Mine inspector for Dickinson County	Iron Mountain.
Robt. Eva, sr	Mine inspector for Ontonagon County	Greenland.
John P. Christopher	Mine inspector for Baraga County	602 Pine Street, Marquette.
Richard A. Smith	Director, Michigan geological and biological survey	Lansing.

MINNESOTA.

Name.	Designation.	Address.
John P. Gardiner	Commissioner of labor and industries	St. Paul.
Oscar M. Sullivan	Chief statistician of labor and industries	Do.
Ed. Smith	Mine inspector for St. Louis County	Eveleth.
W. J. Trescott	Mine inspector for Itasca County	Coleraine.
August Swanson	Mine inspector for Crow Wing County	Brainerd.
F. A. Wildes	Chief inspector of mines, State and school lands	Hibbing.
A. H. Stevens	Deputy inspector of mines, State and school lands	Virginia.
Prof. W. H. Emmons	Director, Minnesota geological survey, University of Minnesota.	Minneapolis.

MISSISSIPPI.

Dr. E. N. Lowe	Director, Mississippi geological survey	Jackson.

MISSOURI.

George Hill	Chief mine inspector	Bevier.
Joseph Goldman	Secretary, State bureau of mines and mining	Jefferson City.
C. C. Keith	Inspector of lead and zinc mines	Joplin.
R. C. Detchmendy	do	Flat River.
C. M. Harlan	do	Carterville.
J. A. Galbraith	do	Webb City.
H. A. Buehler	State geologist and director, bureau of geology and mines.	Rolla.

MONTANA.

A. E. Spriggs	Chairman, State industrial accident board	Helena.
George N. Griffin	State coal-mine inspector	Do.
W. B. Orem	State metal-mine inspector	Do.
Dr. J. P. Rowe	State geologist, University of Montana	Missoula.

NEBRASKA.

Prof. E. H. Barbour	State geologist, University of Nebraska	Lincoln.

NEVADA.

George D. Smith	Chairman, Nevada industrial commission	Carson City.
A. J. Stinson	State mine inspector	Do.
Charles Huber	Deputy mine inspector	Tonopah.
Alex. Baird	do	Ely.

NEW JERSEY.

John Roach	Chief, bureau of mines, department of labor	State House, Trenton.
Augustus Munson	State mine inspector	P. O. box 311, Dover.
Dr. H. B. Kümmel	State geologist, division of geology and waters, department of conservation and development.	Trenton.

NEW MEXICO.

Jo E. Sheridan	State inspector of mines	Silver City.
Prof. R. W. Ellis	State geologist, University of New Mexico	Albuquerque.

NEW YORK.

Edward F. Boyle	Chairman, State industrial commission	230 Fifth Avenue, New York.
W. W. Jones	Mine inspector, State industrial commission	Albany.
Robert W. Jones	Inspector of mines and tunnels, State industrial commission.	230 Fifth Avenue, New York.
Gustav Werner	Tunnel inspector, State industrial commission	Do.
Dr. John M. Clarke	State geologist, University of the State of New York	Albany.

NORTH CAROLINA.

M. L. Shipman	Commissioner of labor and printing	Raleigh.
Dr. Joseph Hyde Pratt	State geologist, North Carolina geological and economic survey.	Chapel Hill.

NORTH DAKOTA.

W. H. Robinson	State engineer	Bismarck.
John Hanwell	State mine inspector	209 Seventh Street, South Bismarck.
Dr. A. G. Leonard	State geologist, State geological survey, University of North Dakota.	Grand Forks.

OHIO.

Name.	Designation.	Address.
Thos. J. Duffy	Chairman, industrial commission of Ohio	Columbus.
Jerome Watson	Chief deputy inspector of mines, industrial commission of Ohio.	Do.
Prof. J. A. Bownocker	State geologist, geological survey of Ohio	Do.

OKLAHOMA.

Ed. Boyle	Chief mine inspector (mines, oil, and gas)	McAlester.
C. W. Shannon	Director Oklahoma geological survey	Norman.

OREGON.

Wm. A. Marshall	Chairman, State industrial accident commission	Salem.
Henry M. Parks	Director, Oregon bureau of mines and geology	417 Oregon Building, Portland.

PENNSYLVANIA.

Seward E. Button	Chief, department of mines	Harrisburg.
Frank Hall	Deputy, department of mines	Do.
A. C. James	Chief clerk, department of mines	Do.
Dr. Geo. H. Ashley	State geologist, bureau of topographic and geological survey.	Do.

SOUTH CAROLINA.

Prof. Stephen Taber	State geologist	Columbia.

SOUTH DAKOTA.

Otto Ellerman	State mine inspector	Lead.
Dr. Freeman Ward	State geologist, State geological and natural history survey.	Vermilion.

TENNESSEE.

A. W. Evans	Chief mine inspector	Nashville.
Wilbur A. Nelson	State geologist, Tennessee State geological survey	Do.

TEXAS.

B. S. Gentry	State mine inspector	Post office box 327, Rockdale.
Dr. J. A. Udden	Director, bureau of economic geology and technology.	Austin.

UTAH.

Preston A. Thatcher	Chairman, industrial commission of Utah	Salt Lake City.
John Crawford	State coal-mine inspector	State capitol, Salt Lake City.
Carl A. Allen	Metal-mining engineer, industrial commission of Utah.	Salt Lake City.
Prof. Wm. Peterson	State geologist, Agricultural College of Utah	Logan.

VERMONT.

Dr. Geo. H. Perkins	State geologist, University of Vermont	Burlington.

VIRGINIA.

John Hirschberg	Commissioner, bureau of labor and industrial statistics.	Richmond.
A. G. Lucas	State inspector of mines, bureau of labor and industrial statistics.	Do.
Dr. Thomas L. Watson	Director and State geologist, Virginia geological survey.	Charlottesville.

WASHINGTON.

James Bagley	State mine inspector	1223 Alaska Building, Seattle.
Prof. Henry Landes	State geologist, University of Washington, Washington geological survey.	Seattle.

WEST VIRGINIA.

W. J. Heatherman	Chief, department of mines	Charleston.
Dr. I. C. White	State geologist, West Virginia geological survey	Morgantown.

WISCONSIN.

Name.	Designation.	Address.
R. McA. Keown	Engineer, industrial commission	Madison.
C. J. Kreilkamp	Deputy, industrial commission	Do.
Arthur A. Findiesen	Mine inspector, industrial commission	Do.
Dr. W. O. Hotchkiss	Director, geological and natural history survey	Do.

WYOMING.

R. T. Sneddon	Coal-mine inspector, district No. 1	Diamondville.
R. V. Hotchkiss	Coal-mine inspector, district No. 2	Sheridan.
G. B. Morgan	State geologist, geological survey of Wyoming	Cheyenne.

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Bulletin 115. Coal-mine fatalities in the United States, 1870–1914, with statistics of coal production, labor, and mining methods, by States and calendar years, compiled by A. H. Fay. 1916. 370 pp., 3 pls., 13 figs.

Bulletin 140. Occupational hazards at blast-furnace plants and accident prevention, based on records of accidents at blast furnaces in Pennsylvania in 1915, by F. H. Willcox. 1917. 155 pp., 16 pls.

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Technical Paper 124. Accidents at metallurgical works in the United States during the calendar years 1913 and 1914, compiled by A. H. Fay. 1915. 28 pp.

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TECHNICAL PAPER 168. Metal-mine accidents in the United States during the calendar year 1915, compiled by A. H. Fay. 1917. 114 pp., 2 figs.

TECHNICAL PAPER 193. Quarry accidents in the United States during the calendar year 1916, compiled by A. H. Fay. 1917. 21 pp.

TECHNICAL PAPER 201. Accidents at metallurgical works in the United States during the calendar year 1916, compiled by A. H. Fay. 1918. 18 pp.

TECHNICAL PAPER 202. Metal-mine accidents in the United States during the calendar year 1916, compiled by A. H. Fay. 1918. 91 pp.

TECHNICAL PAPER 206. Coke-oven accidents in the United States during the calendar year 1917, compiled by A. H. Fay. 1918. 19 pp.

TECHNICAL PAPER 213. Quarry accidents in the United States during the calendar year 1917, compiled by A. H. Fay. 1918. 62 pp.

TECHNICAL PAPER 215. Accidents at metallurgical works in the United States during the calendar year 1917, compiled by A. H. Fay. 1919. 23 pp.

TECHNICAL PAPER 239. Coke-oven accidents in the United States during the calendar year 1918, by A. H. Fay. 1919. 26 pp.

TECHNICAL PAPER 245. Quarry accidents in the United States during the calendar year 1918, compiled by A. H. Fay. 1920. -- pp.

TECHNICAL PAPER 256. Metallurgical accidents in the United States during 1918 compiled by A. H. Fay. 1920. 3 pp.

Coal-mine fatalities in the United States, 1916, compiled by A. H. Fay. 1917. 42 pp.

Coal-mine fatalities in the United States, 1917, compiled by A. H. Fay, 1918. 37 pp.

Coal-mine fatalities in the United States, 1918, compiled by A. H. Fay. 1919. 61 pp.

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